The Outsourcing Unit Working Research Paper Series

Paper 15/05

The IT Function and Robotic Process Automation

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October 2015

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Research on Business Services Automation

Research Objective:

The academic researchers at the Outsourcing Unit (OU) aim to assess the current and long-term effects of business services automation on client organizations. While using software to automate work is not a new idea, recent interest in service automation has certainly escalated with the introduction of new technologies including Robotic Process Automation (RPA) and Cognitive Intelligence (CI) tools. Many potential adopters of the new types of service automation tools remain skeptical about the claims surrounding its promised business value. Potential adopters need exposure to actual and realistic client adoption stories. Academic researchers can help educate potential adopters by objectively researching actual RPA and CI implementations in client firms, by assessing what the software can and cannot yet do, and by extracting lessons on realizing its value.

Acknowledgements:

"Robotic Process Automation and The IT Function" by Leslie Willcocks, Mary Lacity and Andrew Craig is the fourth working paper delivered from this research project. We appreciate and thank the customers, providers, and advisors who were interviewed for this research. We also acknowledge and thank Blue Prism as the launch sponsor of this research.

About The LSE Outsourcing Unit:

The Outsourcing Unit is part of the LSE, acknowledged as the world's premier social science university, and in business and management studies ranked first above Cambridge and Oxford Universities in a 2014 Research Assessment Exercise. The OU draws upon a 2,400 plus case study database covering all major economic sectors and countries, and provides independent, objective and rigorous, timely research, report and advisory services to business, government and third sector organizations. Previous research and published work can be reviewed on www.lse.ac.uk/management/research/outsourcingunit

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The IT Function and Robotic Process Automation

'Robotic process automation is one of the best investments I ever made as a director of IT. I continue to see lots of opportunities on behalf of the business for sustaining this approach. The thing to be cautious about is to continue to grow and respond in a pragmatic, careful and structured way so that in the near future we're not looking at RPA as a problem we've created for ourselves.' – Steve Chilton Director of IT, University Hospitals Birmingham NHS Foundation Trust

'The biggest lesson is about starting the journey with a conjoined IT and business collaborative approach. It's got to work as a partnership. If you don't involve IT upfront, you're doomed to failure because they'll just resist it for many good, and not so good reasons'. - Allan Surtees Telefonica O2 and then Head of IT Delivery, Gazprom Energy

'Once IT is on board very early, and you've got the right people looking at it, then it will go well. The problem I suspect is where people do it more off-the-cuff, they don't have the right level of governance, controls, and segregation of duties and then that can leave organizations a little bit exposed.' – Kevin Mowles, Head of Business Delivery, Leeds Building Society

Introduction

Back offices from highly competitive industries like telecommunications, utilities, financial services and health care through to government agencies worldwide are ever under pressure to contain costs. But cost efficiency must be balanced with other performance imperatives such as service excellence, business enablement, scalability, flexibility, security, and compliance. From 25 years of research, we learned that low-performing back offices can be transformed to high-performance through five main transformation levers: **centralize** physical facilities and budgets, **standardize** processes across business units, **optimize** processes to reduce errors and waste, **relocate** from high-cost to low-cost destinations, and **technology enable** with, for example, self-service portals.[1] Further developments in **automation**, including software robots, have added a sixth lever.

Only in the last three years has the real power of service automation been unleashed, though as at Autumn 2015 Robotic Process Automation (RPA) was still only at the early majority stage of adoption. Meanwhile, more advanced forms of 'cognitive' or 'intelligent' automation were still either being piloted at client sites, or still on the drawing board for future commercial development. Future evolution would seem to begin with RPA which is optimally used with high

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volume, standardized, rules-based mature stable processes where costs are clear and business value well understood. HFS/KPMG have suggested a continuum into 'autonomic platforms' – service providers like GenFour and CapGemini already use the term for offering multiple types of automation software – followed by 'cognitive computing' and 'true artificial intelligence'.[23] These advances will move the focus from automating structured to unstructured patterned then unstructured, patternless data/information. Meanwhile the robotic software will increasingly be able to deal with rules-based, dynamic processes, and carry out advanced judgment and decision-making tasks.[4] We anticipate an accelerating take-up of multiple forms of automation across 2015 and 2016, as executives acquire detailed understanding of specific products and applications, and gain confidence on automation implementability, reliability, and business benefits.

In this paper we focus on the IT function and its role in RPA. Why? Because our in-depth case work and interviews show much misunderstanding about RPA's attributes, and how RPA fits with corporate IT architectures, infrastructures, skills sets, governance and security procedures. In our view this has created unnecessary barriers to adopting RPA, and delays to gaining the large process and business benefits manifestly available – as demonstrated in our case studies.[5] Some RPA adopters in our research have automated over 35 percent of their back office transactions. Clients report significant, multiple, often simultaneous benefits ranging across cost, process efficiency accuracy, regulatory compliance, speed, reliability, error reduction, and improved customer satisfaction. Once corporate users pilot and adopt RPA, all report greatly expanded RPA usage - both in volume and extension to new processes. The new breed of automation software providers includes Blue Prism, Automation Anywhere, Celaton, IPsoft, and UiPath. Many of their tools are so easy to use that business operations, including people with process expertise but no programming experience, can be trained within a few weeks to automate processes. Business operations groups from companies such as the Associated Press, Ascension Health, Xchanging, Leeds Building Society, and Telefónica O2 have been using RPA to automate processes quickly—often with limited help from centralized IT.

However, therein lies a major challenge. Chief Information Officers and other IT professionals need to ramp up quickly on what RPA can and cannot do for their organizations. They need to know how RPA can be leveraged for the long term, and the critical role IT professionals play in RPA success. In this paper we first provide a description of robotic process automation, to make

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clear what it is, what it can do, and how it relates to mainstream IT and business Operations. We then show how the IT function has immense challenges, but argue from the case evidence that RPA, properly managed, relieves and can even be a real solution to these, rather than just an additional problem. Specifically we pull out five major challenge areas, and show how, in practice, in the researched organizations, these were navigated with relative ease. We then look at six cases in more detail and draw out the lessons learned from the cross-organizational, evolving history of RPA, and the emerging components of an effective implementation methodology.

Understanding Robotic Process Automation

Although the term "Robotic Process Automation" suggests physical robots wandering around offices performing human tasks, RPA is a software-based 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 'robot' to do the work previously done by people. RPA software is ideally suited to replace humans for so called "swivel chair" processes; processes where humans take inputs from one set of systems (for example email), process those inputs using rules, and then enter the outputs into systems of record (for example Enterprise Resource Planning (ERP) systems) (see Figure 1).

Consider, for example, a human resource (HR) specialist in charge of onboarding new employees for a large company. The onboarding process likely entails logging 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 using standard rules. 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 to perform these routine tasks.

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Figure 1:
RPA Software is Ideally Suited for "Swivel Chair" Processes

That's what Robotic Process Automation (RPA) does—interacts with other computers systems just like a human would. If configured correctly, the RPA software should do the work better, faster, and much cheaper than the HR specialist. The HR specialist in this scenario would be free to focus upon non-routine tasks, such as working with business units to craft job descriptions, suggesting appropriate recruiting outlets, fielding calls from potential applicants, reviewing resumes, and calling references. The HR specialist would also handle all the non-routine exceptions the RPA software could not process. There would be fewer HR specialists needed overall if the volume of work was constant, but those HR specialists remaining should have more challenging work.

So given this typical scenario, some Chief Information Officers 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 other BPM tools:

1. RPA is easy to configure; developers do not need programming skills. The RPA interfaces work a lot like Visio, by dragging, dropping and linking icons that represent steps in a

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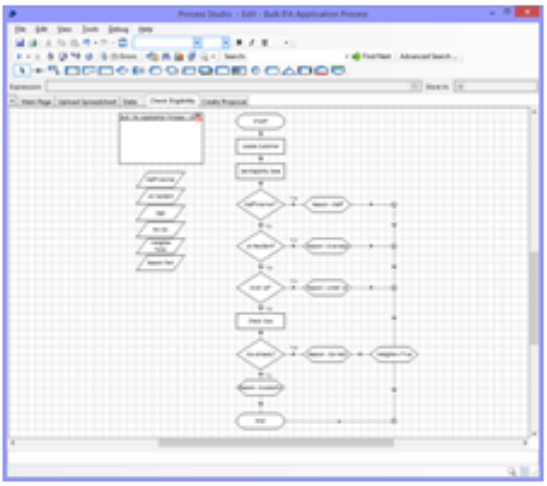
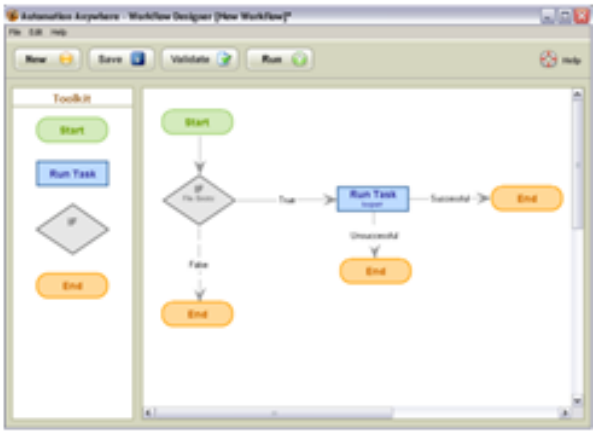
process. Figure 2 has a screen shot of the development environment from two of the most popular RPA software providers, Blue Prism and Automation Anywhere. As users drag and drop icons to automate a process, code is generated automatically. Business operations people, with process and subject matter expertise but with no programming experience, can be trained to independently automate processes within a few weeks. In contrast to RPA software, BPM solutions require coding expertise.

Figure 2:
User Interfaces for RPA Software



Blue Prism screenshot for development environment



Automation Anywhere screenshot for development environment

2

2. RPA is "lightweight" IT in that it 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 is typically adopted outside the control of the IT department.[1] We will qualify this understanding when we come back to redefining '"lightweight" IT later, since we believe that 'lightweight IT needs to receive IT sanction to stop it becoming rogue IT and the risks this engenders. RPA technology sits on top of existing systems--without the 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

[1] Bygstad, B. (2015), "The Coming of Lightweight IT", Proceedings of the *23rd European Conference of*

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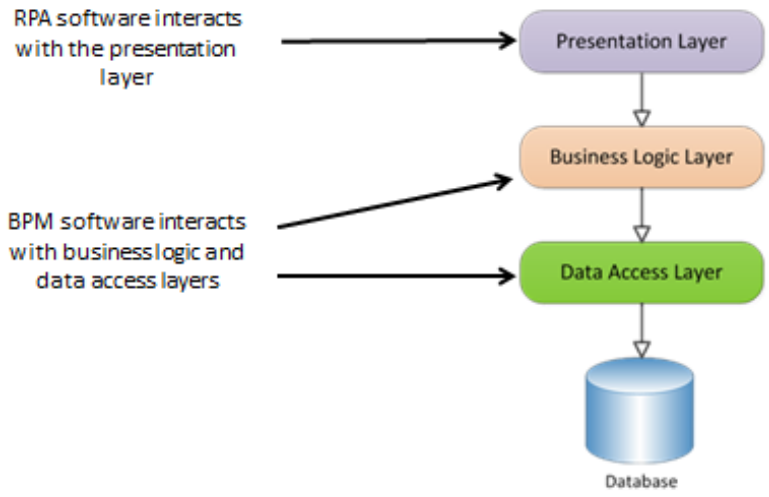
password. RPA software accesses other systems through the presentation layer—so no underlying systems programming logic is touched (see Figure 3). RPA products do not store any data. In contrast to RPA software, BPM solutions interact with business logic and data access layers.

Figure 3: RPA as "Lightweight IT"



RPA does not replace BPM, but rather complements it (see Figure 4). RPA and BPM are each suited to automating different types of processes. BPM solutions are best suited for processes requiring IT expertise on high-valued IT investments like ERP and Customer Relationship Management (CRM) systems. BPM solutions are developed by IT staff. The two distinguishing attributes of RPA software—it's designed for non-programmers to use and it does not disturb existing systems—means the threshold of business processes worth automating are substantially lowered, as illustrated by the blue tail in Figure 4. Now, those swivel chair processes that are owned by operations and are too small to justify the use of IT development resources can be automated by operations folks. RPA solutions are typically deployed by business operations staff with IT oversight (but not with IT developers) for processes that require business and process expertise. The significantly lower IT investment costs now makes automating these processes financially beneficial. Pat Geary, CMO for Blue Prism, said:

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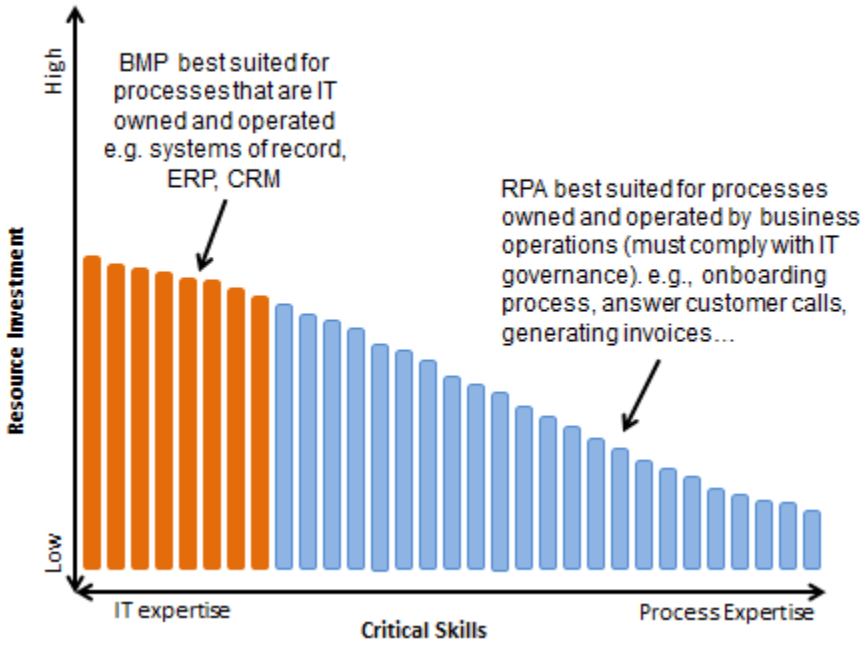
"We are not trying to replace enterprise IT, and we are not really trying to compete with BPMS. It's really this long tail of processes that are typically deployed by humans that are most suitable for RPA. Humans can be redeployed to more intelligent decision-making tasks."

Figure 4: BPM and RPA as Complements



Based on interviews in 12 large organizations, Forrester Research[2] found that enterprises benefit from both BPM and RPA technologies (see Table 1). It argued that RPA complements BPM: *"The trick is to put them together in the right combination to achieve your strategic goals"* (Forrester Research 2014 p. 2).

Table 1: BPM versus RPA
Adapted from Forrester Research (2014)

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

[2] Forrester Research (2014) *Building a Center of Expertise to Support Robotic Automation*.

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Having established RPA's actual attributes and functionality, we will now move on to see how RPA plays into the major challenges of the IT function and how, far from an additional piece of shadow or grey IT, RPA can, if properly managed, provide a complementary and powerful solution.

Challenges of the Modern IT Function

Our most recent studies covered over 130 IT functions.[6] What emerged? Today's IT functions experience multiple, often conflicting, pressures and demands (see Figure 5). Business pressures are now intense. The high profile area is business-IT alignment. This is very difficult to achieve, with dynamic business contexts leading to constantly changing requirements. IT functions are now judged increasingly on business metrics in terms of quality, responsiveness, business value, end-customer service and satisfaction, cost efficiency, fit with business need, and time to market. IT functions are also judged by increasingly knowledgeable, IT literate and demanding users at 'coal-face' operational levels.

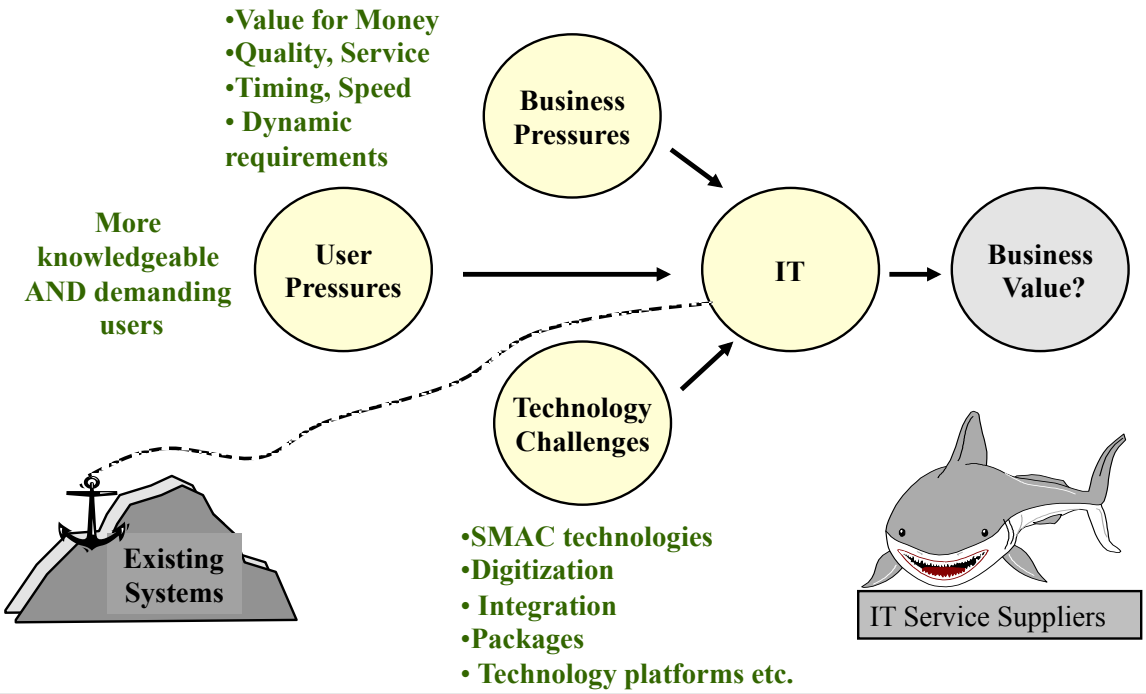

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Figure 5 – Pressures and Challenges For IT

Behind the scenes, IT functions are devoting anything between 30-70% of their effort and cost on maintaining existing legacy systems.[7] Failure here, and the knock-on effects to internal users and external customers, can become high profile very quickly, as, for example, several UK banks found in summer of 2015. Keeping the technology platform, architecture and infrastructure operational, streamlined, secure, and resilient for the long term, while not detracting from business performance is a major undertaking now that IT is the engine room of the modern, digitizing organization. Deploying external service providers both onshore and offshore has been seen as one way of relieving the pressure on delivery. But our studies over the years show that outsourcing needs strategic direction, distinctive in-house capabilities, and constant management attention. The threat of further outsourcing may sharpen internal performance, but also creates further pressures on, and attention issues for, IT executives.[8]

Above all, in terms of expertise, advice and decision-making, the CIO and IT function form an organization's central capability on information and communications technologies. IT executives are expected to proactively innovate for business value through ICT development, implementation and deployment. Their key role is to navigate existing and emerging technologies, in order to lead/guide the business in piloting, adoption, sourcing, and usage decisions. In itself, navigating through the techno-hype, the capability becoming available, the IT that is merely useful and may be an expensive distraction, through to what will be of real strategic value is, today, an immense challenge. Social media, business analytics, mobile, and cloud as-a-service (SMAC) technologies and applications, as well as software packages, are proliferating at an accelerating rate.

Bigger still, on an eight to ten year horizon, strategically organizations are attempting to shift their existing technology architecture, infrastructures and applications towards digital platforms that can underpin the development, of what we call 'cloud corporations', i.e., digital businesses.[9] The daunting scenario facing the CIO is shown in Figure 6. Our most recent work suggests a range of challenges here[10]:

- Adoption of any major new technology is necessarily an arduous process banging up against culture, existing structures and governance modes.
- With cloud computing there are still genuine security and privacy challenges that have to be worked through.
- If governance and sourcing were a challenge in the past, cloud computing introduces

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new and more rapid risk.

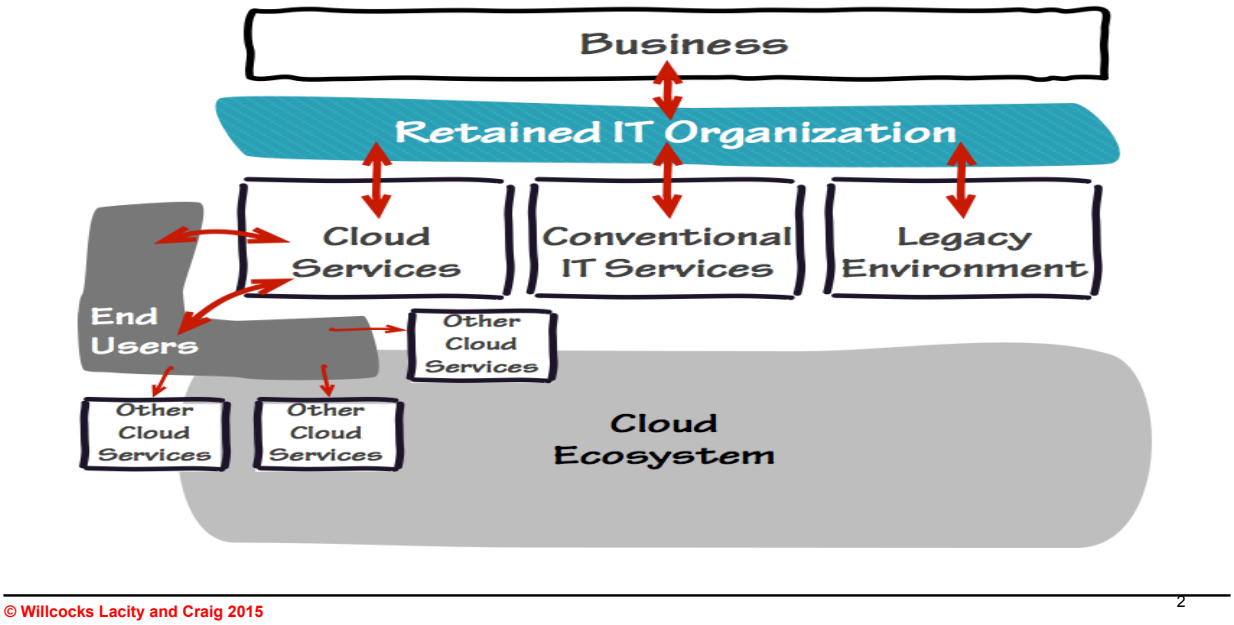

Figure 6 – Cloud Challenges
(Source: Willcocks et al. (2014) *Moving to the Cloud Corporation, Palgrave)*

- Integration with legacy technologies, and defining and executing the migration path to cloud computing can become a major obstacle. Many legacy systems are unsuitable for migration to the cloud computing so service integration becomes much more critical to achieving the true benefits from cloud computing.
- Governance and interoperability in the larger cloud computing 'ecosystem' become key.
- The human resource implications of cloud computing are considerable; we are finding digital skills shortages in-house a major drag on making progress on cloud computing.
- With all these challenges, very often the challenge of getting business innovation from cloud computing is being postponed.

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RPA Implications

While individually each pressure or demand would seem to be manageable, it is the cumulative interdependent effect that is so daunting. Not surprisingly, with so many difficult challenges, and the likely high - and high profile - costs from 'dropping the ball' as it were, IT executives need in their armoury control, regulation, standards, change management, security policies, and strong governance. If Robotic Process Automation plays outside these, seems to be taking over roles IT legitimately occupy, and adds yet another threat or challenge to the IT estate, then IT executives will, understandably, react negatively. They can, and in our research experience did, ask five questions:

1. Is this RPA vocabulary misleading? – 'It sounds like IT to us'.
2. Does RPA really help IT achieve our business imperative of better, faster, for less?
3. How far is RPA yet more 'shadow' or 'grey' IT outside permissible limits and creating knock-on threats?
4. Surely RPA should be an IT project, under our control?
5. What are the governance, skills set and organizational threats and implications we need to deal with?

In the next section we look at these questions and how they have been answered in practice.

Resolving Five RPA Challenges

Challenge 1: Misleading RPA Vocabulary

We have attempted to head off some of this problem with the detailed explanation of RPA in an earlier section. But it is worth pointing to particular misunderstandings that emerged in our research. The words 'robot', 'robotic software', 'developers', 'designers', and 'analysts' mean different things to different people.

An RPA 'robot' is not a physical robot. The first point of departure is that clients are not dealing with a physical robot. However it is a software robot, but not normal software. According to Jason Kingdon, chairman, Blue Prism: *'they call it a robot because it's attempting to have all the characteristics of a virtual human.'* However, it is an infinitely scalable human being that can be instructed very quickly in order to carry out operational procedures at the speed of a machine

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which means the cost line can radically move down, therefore more work suddenly becomes absolutely within scope.

Robotic 'software' is non-invasive compared to typical IT software. The second misunderstanding is the idea that RPA builds robots that then interact in new ways with existing IT systems. In practice, the client does not build a robot, but rather 'teaches' or 'configures' the robot software rules and instructs it to press keys. Furthermore, while IT needs to be involved and there are touch points, on the whole RPA is in fact non-invasive:

'A robot mimics the way that a human being interacts with these underlying security, audit, and access systems. Not only are you getting the interface that is already there because the robot can do the same as a human being can, the security models and the process models are also already in place because you already have a model in terms of the way that you access, that certain systems are allowed to talk to each other, that certain procedures must follow one to the other if you're a human being. All of that comes off-the-shelf as part of putting the robot in place because in principle, it is another employee. It just happens to be a virtual employee.' – Jason Kingdon Chairman, Blue Prism

An RPA 'developer' configures RPA software whereas an IT 'developer' writes programming code. The third set of misperceptions comes from RPA using a language normally pertinent to an IT delivery function, in particular the terms 'developer' and 'designer'.

'So we have a robotic process automation developer and people automatically think, well it's software development isn't it? Well no it isn't. Similarly, we need a designer to design/document the end-to-end process, but that's all we're doing. We're not designing a software development solution with a number of applications….this misperception is by far the biggest issue. And in some larger organizations where they've got teams of enterprise architects, solution designers, software developers and testers, there is going to be a lot of confusion'. Allan Surtees, Head of IT Delivery - Gazprom Energy.

The confusion leads to the conclusion that RPA people may be doing the work of IT people, when they are not. For example, as Leeds Building Society the in-house IT development team dragged their feet the most, more because they felt that RPA was something potentially within their skill set to deliver in-house.[11]

As one of our respondents put it: *'It isn't just another piece of software. It's a different approach'.*

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An RPA 'analyst' is a process expert who proactively seeks automation opportunities and typically writes detailed RPA requirements whereas a typical 'business analyst' serves as a liaison between user needs and IT requirements. A further example: A Business Analyst is normally an expert in the business process, working with the business to understand a set of requirements, resulting in an IT change. In RPA the analyst is actually someone who goes around and finds processes to automate, a slightly different role. You could use a standard Business Analyst, but they would not be writing requirements documents, more a document that talks about the end-to-end process. Neil Wright of Blue Prism said:

'There are subtle nuances about the roles (and indeed the delivery methodology and operating model) that differentiate RPA from traditional IT. The analyst role is a good example – we call the role "Process Analyst" as opposed to business analyst. The "Developer" role is a very interesting one. We have toyed with many different descriptions over the years including – modeller, developer, designer and even, configurator. We have found that each of these can be embraced or rejected by clients/prospects/partners in equal measures but none of the role names have been embraced by all'.

In Practice: Don't change RPA terms, better explain them

In our case studies, RPA invariably caused initial confusion, and some trepidation amongst IT departments, mainly because of the language used. Once the business case, and RPA itself, was understood, the fear and opposition tended to dissipate, including amongst Operations staff.[12] Allan Surtees comes from the IT side and has experienced RPA implementations in two different corporations. He comments:

'The terminology needs to change away from trying to use standard IT Delivery type terminology because I think that confuses people. This is because there's a fear factor there in both business operations and IT. From a business operations perspective people say 'Is this going to take my job?, 'are you going to replace me with a robot'? – even though it's a mundane, repeatable, manually intensive task they do not like doing. On the IT side architects say 'you're going to allow customer service people to develop code'?. I said, no, this isn't about development of code. Then *you've got software developers saying, 'Well this is going to take my job away' Well, it's not actually because it's not software development'.* – Allan Surtees, Telefonica O2, then Head of IT Delivery - Gazprom Energy.

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It may well be that clearer explanations and vocabulary are needed, and that this issue will pass on into the next rounds of automation we flagged earlier with terms like autonomics, intelligent automation and cognitive automation. But given the long-standing messy proliferation of new terms in the hi-tech world, a better approach, substantiated by the case evidence we have seen, is educating potential clients as to what exactly RPA is, and how it fits with the IT group and IT systems, and bringing the IT function early into this education process. As Allan Surtees of Gazprom Energy told us:

'It's just getting your head around what it actually is. Though it looks similar – i.e. you use the same rigour that you would in delivery of any IT change - you have to have development/test environments, you have to design the end-to-end process from documentation (if it exists!), you have to develop an end-to-end process using the tool to train a robot and then you have to test that it works before implementing it - it really is not an IT delivery, though it does share some attributes.'

Challenge 2: Better, Faster For Less

Today's IT functions are expected to square the circle (or perhaps triangle) on resources, time and quality. Classically, these three project components are seen as trade-offs. If you want to do it quickly, it will cost more and/or quality will suffer. If you want to reduce costs and resources expended, then expect quality to go down and the timeframe to lengthen. In today's corporations, however, senior business executives expect IT to be delivered faster, better and cheaper, simultaneously, and adjudged primarily on business, not IT metrics. One of our very experienced respondents put it another way:

'How do you take a finite IT resource, and map it against the infinite demand that you get from the business. Because, in my experience, they're continually consuming and using IT, and requiring more and more to remain competitive.' – IT executive, major utility

The pressure, then, arises from the enormous, rising demand for IT. Enter Robotic Process Automation. In our case studies of success, RPA was touted invariably because of a business problem, and/or a huge backlog in IT developments/fixes required by the business. At Telefónica O2 Wayne Butterfield, Head of Back Office services, had already pulled all the other levers to do more work with less money. His vision was to reduce FTE count by 50 percent,

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reduce average response time by 50 percent, and reduce Back Office failure customer calls by 50 percent. It is within the context of market pressure and business strategy to improve customer service and to reduce business operations costs that a utility company's RPA deployment took place. Servicing the London insurance market, Xchanging had a huge and rising amount of back office, high volume, repetitive data collection and processing tasks, many of them still manual, and many still taking data from non-integrated legacy mainframe systems. RPA seemed a natural fit. For Steve Chilton IT Director at University Hospitals Birmingham NHS Foundation Trust:

'The majority of areas where we've used RPA is to address what I describe as business conundrums, not necessarily IT conundrums, for example, pharmacy stock control transactions, where we implemented in days not months, and much cheaper than any alternative. RPA has been used to support functions including HR, Recruitment, Financial, Patient Administration, and Logistics, as well as supporting IT automation needs.'

At Leeds Building Society:

'We are not unique in terms of having that common frustration in Operations of having a significant schedule of developments and too few being able to get through the pipe at any one time. So there's 101 things to be done and our' 'long tail' of change has become even longer. So deploying RPA, initially as a tactical solution, was very welcome.' – Kevin Mowles, Head of Business Support, Leeds Building Society.

Meanwhile at Gazprom Energy the issue is also meeting sales growth targets with limited people resources:

'We've got large growth targets as part of our mid to long term business plans, and naturally we are driving sales across all of our customer segments, which can put pressure on the back office function. A lot of our business processes are manual and repeatable so if we can get RPA to work these processes as they come through, it should allow us to meet our targets and take the pressure off our back office teams.' - Allan Surtees, Head of IT Delivery, Gazprom Energy.

Whether initiated by business operations or IT executives, in all these cases RPA played straight into IT's 'better, faster for less' dilemma. But with what results?

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In Practice: RPA eases IT workloads and delivers high-quality results quickly and inexpensively

We have documented already the types and levels of success experienced at three organizations – Telefonica O2, Xchanging and a major utility - using RPA (see also Table 2 below).[13] The papers show in great detail how RPA has been successfully utilized to address the 'better, faster, for less' dilemma. We have gained further insights from three other organizations – Leeds Building Society, Gazprom Energy and University Hospitals Birmingham Foundation Trust. Looking across these, RPA proved to be a good 'squarer of the circle' for business and process problems.

	# processes automated	# RPA transactions per month	Business Value	ROI
Telefonica O2	35% of back office (15 core processes)	400,000 to 500,000	Faster delivery Better service quality Higher compliance Unbeatable scalability Strategic enablement FTE avoidance FTE redeployment FTE savings	650% to 800% 3-YR
Utility	35% of back office	1 million		200% 1-YR
Xchanging	14 core processes	120,000		30% per process

Table 2: RPA Value delivered in client case studies

Some illustrative examples:

'We have used RPA to significantly enable the organization in terms of efficiency, ease the burden of overheads, reduce cost, and supporting the delivery of improved outcomes for our patients. The more that we can do to speed up efficiently designed processes and enhance transactional quality potentially releases capacity and other efficiencies within the organization

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which ultimately go back into patient care activities. It's been an effective vehicle for that.' – Steve Chilton Director of IT, University Hospitals Birmingham NHS Foundation Trust

'*I'm utilising my 'Small Change' manager who has a large backlog of change requests he just can't deliver using standard development on legacy systems. He can probably use RPA to fulfill a significant number of those change requests. Rather than IT do the development on the system, you replace it by just letting the robot perform the same end-to-end process, so releasing the developers to do more value-add work. So does IT do the development on the system, or replace it by keeping the same process but just letting the robot perform it, so releasing those individuals to do more value-add work? It's an easy decision.'* – Allan Surtees, Head of IT Delivery, Gazprom Energy.

We found RPA also easing the workloads of the IT function and even being applied within IT function work itself. All our respondents reported big reductions in development time, for example:

"It's been very fast when traditionally, we've been used to seeing nine to 18 month timescales for deployment as opposed to six to eight weeks." – Kevin Mowles Head of Business Support, Leeds Building Society

Steve Chilton, Director of IT, University Hospitals Birmingham NHS Foundation Trust commented:

'My worry is that IT shops will not embrace RPA for the business, and either see RPA only as a tool to help them address IT issues, or will fail to support RPA appropriately, seeing RPA as a threat. We do use a bit of RPA in IT, for example in end-user experience monitoring, but largely we're using RPA as a real asset (working closely with and in support of business process stakeholders) to address business process proficiency problems within the organization.'

Commenting on three recent automated mortgage lending assessment and savings application processes, Kevin Mowles at Leeds Building Society said:

'The business results have been excellent. In terms of the first assessments, we've got 98% completion rate (by RPA). For electronic ID searches it's not as straightforward, and we have 9% business exceptions and 4% system exceptions. The savings maturity application has a 70% RPA completion rate but it was always accepted that that would be the case. The main

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other benefits we've seen are significant speed, reliability, accuracy, and of course reduced costs.'

At Leeds Building Society (LBS) they are experiencing annual growth in workloads. However, workflow can be volatile because it is dependent on market pricing of products. At the same time, major investments in the core IT infrastructure impacted on the business units through reduced organic development:

'So when you are able to introduce changes into the frontline through mortgage lending and through savings, the guys were lapping it up. It had become important for us to find a tactical solution where we could deliver process change.' – Kevin Mowles Head of Business Support, Leeds Building Society.

Mowles, as did all client respondents, also pointed to the advantage gained from the reusability of the objects built in RPA. They can be recycled into other processes, so growing RPA capability further. Thus Mowles predicted RPA in ten LBS processes by September 2015, and in a hundred processes by 2017.

To summarise what IT and Operations executives told us in our case research: For the IT department, first of all RPA can give quick, multiple business wins to their business customers, and simultaneously relieve pressure on the IT work backlog. Secondly, RPA costs a lot less than many other solutions. Thirdly, organizations can introduce RPA very quickly with no great effort. Fourthly, RPA is a real asset, extendable to many pressing business conundrums. And lastly, the management problems IT experiences from RPA are trivial, with very little fallout, as long as RPA is subject to proper controls by the IT function. Which brings us to 'lightweight' versus 'heavyweight' IT.

Challenge 3: Lightweight versus Heavyweight IT

Shadow IT is proliferating as the attractions of mobile, cloud services, social media, endless new apps and the like drive purchases and deployments outside corporate IT. Software as a Service (SaaS) provides a case in point. Initial cost-benefit analyses of SaaS may make shadow arrangements look immediately attractive, but losing control of architecture, security, applications and deployment can have far-reaching and damaging consequences. Elsewhere we also point out that, in heavily regulated sectors, such inexpensive, easily available, quickly implemented, seeming low maintenance shadow IT may prove not to be so attractive once

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regulatory agencies start viewing them as 'critical'.[14]

Is RPA shadow IT? All experienced users we interviewed agreed that, if badly implemented as a very basic tool outside IT sanction, RPA has limited business use, and can wreak havoc with security and enterprise architecture.[15] As 'grey', 'stealth; 'shadow', or even 'user-led' IT, RPA can introduce operational risk, IT insecurities, create fault lines in applications. Further it loses the advantage gained from properly developed and implemented RPA (described below) in being un-scalable.

But as we indicated above, as a programme that evolves into an enterprise capability, effective RPA is better characterized as 'lightweight' IT. Our colleague Bendik Bygstad first coined the term in his recent paper *The Coming of Lightweight IT.*[16] Bygstad characterizes 'heavyweight' IT as the traditional systems and databases, which are becoming more sophisticated and expensive through advanced integration. There is an on-going effort to integrate IT silo systems into seamless solutions by various technologies, such as service-oriented architecture and cloud computing. We should regard this as a new wave in software development: the technical and management challenges are significant, and the costs are very high. The solutions are quite advanced, but also more complex.

He portrays 'lightweight' IT as the new paradigm of mobile apps, sensors and bring-your-own-devices, also called consumerisation or Internet-of-Things. For him, the key aspect of lightweight IT is not only the cheap and available technology as such, but the fact that its deployment is frequently done by users or vendors, bypassing IT departments. For Bygstad, the technology calls into existence the possibility of a new socio-technical knowledge regime with IT-based innovation increasingly being conducted by non-IT professionals. He suggests calling the phenomenon 'lightweight' IT, because it is 'light' in several aspects: It is typically cheap and easy to use technology, it can often be deployed without IT specialists, and it tends to be mobile technology. He defines lightweight IT as 'a socio-technical knowledge regime driven by competent users' need for IT services, enabled by the consumerisation of digital technologies.' He suggests that to preserve the advantages of both lightweight and heavyweight IT, they should be only loosely integrated, in terms of technology, standardisation and organization.

There is a problem with this argument, as Bygstag recognizes himself when he says that lightweight IT '*presents organizations with a whole set of new challenges concerning use, security and IT governance.'* He also talks approvingly of the concept of "bimodal IT", coined by Gartner (2014), who suggest two different IT departments: one for traditional IT, focused on

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stability and efficiency, and one experimental and agile, focused on time-to-market and tight co-operation with business units. For him lightweight IT extends this perspective. However, while Gartner suggest two different IT departments, or perhaps an IT department operating in two different modes, Bygstad suggests that lightweight IT should only be loosely coupled with mainstream IT, that the IT function will often be bypassed, and offers no practical solution to the risks he recognizes in doing so.

Our studies of RPA implementation present an interesting test case for Bygstad's definition of lightweight IT. They suggest strongly that the definition is best modified to: ***'a socio-technical knowledge regime driven by competent users' need for IT services, enabled by the consumerisation of digital technologies, and consistent with IT governance, security, architecture and infrastructure.'*** This means that the level of coupling depends on the non-invasiveness of the lightweight IT, and how far it is to be evolved into an enterprise capability. Lightweight IT, as such, can still be IT enabled innovation in the business. It can still operate largely outside 'heavyweight' IT resources. Moreover, it can be implemented quickly, as a business project, using a different approach from that used for heavyweight IT projects – as we shall see more precisely in the next section. In the case of RPA, its non-invasiveness depends on how it has been designed, while in our cases at least, all clients wanted to build RPA into an enterprise capability. Implemented within this definition, RPA becomes lightweight IT, and avoids the perils IT executives rightly associate with 'stealth' 'shadow', 'grey' and 'end-user' IT.

In Practice: RPA is lightweight IT that benefits from business-IT cooperation

In a major utility and Telefonica O2 cases we researched, RPA was initiated outside the IT department and operated at low scale under the IT function's radar, until alarm bells began to ring. It was only once the IT department became significantly involved, and satisfied, that RPA use escalated, and an enterprise RPA capability began to be built, supported by both business unit and IT resources. In the case of Xchanging, a service provider with a mature reengineering and IT capability, RPA was initiated by senior executives in its insurance business, but IT was quickly involved, and though some IT people were, at first, skeptical, the business and IT cases for RPA proved convincing. Moreover, IT had to be involved because:

'*Our deliverable wasn't only towards processes, but to put a framework in place that could be leveraged for the Group – to institutionalize it.'* — Paul Donaldson, Xchanging

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At Leeds Building Society:

'To start with this was very much outside of IT. However, once we'd decided that this was the route that we wanted to go down (in the middle of 2014) and we reached internal agreement on a pilot and the money had been assigned, then from that point IT have been firmly involved.' – Kevin Mowles Head of Business Support, Leeds Building Society

At University Hospitals Birmingham NHS Foundation Trust, RPA always fell under the control of Steve Chilton the IT Director, who initiated RPA there, while at Gazprom Energy, Allan Surtees, Head of IT Delivery had previous RPA experience at Telefonica O2, and understood the importance and role of the IT function in its adoption and how to build RPA into an enterprise capability.

The weight of evidence suggests that RPA is lightweight IT as we have redefined it. But if it lightweight IT how is it best implemented?

Challenge 4: Business and Operations versus IT Projects

For the last 15 years business executives, and many CIOs, have recited the mantra that *'there are no IT projects anymore, only business projects that are IT-enabled.'* Our own research into 26 IT enabled innovation cases suggests that more precisely they mean that most projects with a business imperative - and all IT-enabled business process innovation - need to be business/user led rather than IT led.[17]

RPA can be characterised as an IT-enabled business process innovation. How should RPA be managed? Our colleague David Feeny helps us enormously by delineating two fundamentally different ways of dealing with IT projects in the modern organization – 'specialist focused' and 'business/user focused'.[18] A specialist-focused approach is useful where there are clear technical problems, known solutions, the work required is in the technology platform, the technology is relatively stable and mature, and business user input required is trivial. Such projects can be primarily led by IT specialists. Detailed requirements and time-scales can be established and the outcome will be increased IT efficiency and improved technology platform. (See the Technical approach column in Figure 7). Much heavyweight IT may be handled in this way, though more often these days with an agile- informed rather than a waterfall development

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philosophy.

On the other hand, projects embodying IT-based business innovation are firstly business projects, and secondly are inherently unstable. They present adaptive/innovative and not just technical challenges (see Figure 7). Detailed business requirements, as opposed to the overall business objective, are unclear and subject to rapid change. Flexibility for further learning and innovation is required. Additionally the technology itself (less so RPA) may be underdeveloped, lacking stability, and detailed technical specification. Alternatively, it will be a developed technology or piece of software, but being used in a new organizational setting (the case with RPA). Here it is unwise just to contract development and delivery to IT specialists, whether these be in-house or external service providers. Instead a multi-functional team drawn from users, operations, IT and suppliers needs to engage with defining the problem, and arriving at and implementing a solution. Learning is vital, innovation is usually necessary, and a general business goal rather than precise metrics point the way forward. Buy-in by multiple stakeholders – in the case of RPA business executives, operations staff, end-customers as well as the IT function - is vital. Such projects, especially when they have strategic business value, or like RPA will become an enterprise programme, require a high-level sponsor and a project champion, both taken usually from the business, not the IT side.

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ISSUE	APPROACH: Technical	Techno/Adaptive	Adaptive/Innovative
Problem Definition	Clear	Clear	Unclear; Requires learning
Solution and Implementation	Clear	Requires learning	Requires much all-party learning
Primary Responsibility	Specialists	Specialists and User; Participatory	User with specialists; Multi-functional teams
Type of Problem-solving	Technical	Technical--adaptive	Adaptive--innovative
Contract with IT/ External Services	Requirement Based	Time/materials Resource-based	Shared Risk-reward Outcomes-based
Objective	Efficient use of existing technical know-how	Effective implementation of existing solution in new setting	Effective business solution
Primary Leadership	Specialist	Collaborative	Business Sponsor/ Champion

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Figure 7 - Specialist-Led, Collaborative and Business-Led Approaches

Such approaches invariably embody some form of 'time box' philosophy. Business needs the solution quickly. A time discipline is placed on the project. The 80/20 rule is applied to functionality. Development proceeds through prototyping and learning, and the project is broken down into multiple projects or stages, each with a business deliverable - digestible chunks, as it were, or as we have called such projects 'dolphins, not whales'. Thus with RPA, we found adoption decisions highly influenced by the speed with which RPA could be implemented and produce business results. An important finding on time-box projects, however, is that though the development will be usually within the business, what is delivered must not be a 'portakabin', i.e., a building outside the IT architecture and infrastructure blueprint.

Analysing what people told us about successful RPA implementations, it is clear that depending on the IT maturity and needs of the organization, RPA falls somewhere between the techno-adaptive and adaptive-innovative approaches shown in Figure 7.

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In Practice: Business operations leads RPA

In every one of our cases, RPA was manifestly both a response to a business problem, and to the IT function being under terrific pressure to deliver on multiple business priorities while looking after the IT plumbing. Our Figure 5 becomes real, as it were. The emerging truth is that in many cases RPA is a response to business problems that have been low on the long list of IT priorities, or which the IT function cannot deliver on quickly and cheaply enough, despite the business value.

In the cases we have investigated, RPA was accepted as an Operations programme, with IT collaboration and scrutiny. This can be seen for example in the Telefonica O2, Xchanging and in other cases.[19] The only exception was where RPA was initiated by a senior IT executive who kept control on a temporary basis, to allow the Operations people to mature their understanding and capability in the area. At the University Hospitals Birmingham NHA Foundation Trust, RPA was initiated by the IT Director Steve Chilton, who nevertheless commented:

'RPA is an operational asset that needs to be mobilized and led run and led by business process stakeholders working closely with IT, process subject matter experts, and process efficiency experts. IT use RPA as an enabler for business process stakeholders working as part of a wider programme group'.

At Leeds Building Society Kevin Mowles, Head of Business Support, also endorsed that RPA had to be business/operations led:

'Whilst it's Operations led, IT supported the delivery through the provision of a Business Analyst and Project Manager. Internally we have a projects portfolio, and all central change is coordinated through IT. The identification of the pilot processes and subsequent development have all been operations led.'

Our cases establish that RPA must be managed as a business and operations project and programme, not an IT project. (Unless an IT department uses RPA software to automate IT processes, in which case the IT department would lead the effort.) But what are the resulting implications for RPA governance, skills sets and organization?

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Challenge 5: Governance, Skills Sets and Organization IT governance

IT governance can be defined as *"specifying the decision rights and accountability framework to encourage desirable behaviour in using IT*."[20] According to Weill and Ross, the experts in this area, top performing enterprises generate returns on their IT investment up to 40% greater than their competitors, and IT governance explains a big part of these differing results. The important components of IT governance are: IT Principles – clarifying the business role of IT; IT Architecture – defining integration and standardisation requirements; IT Infrastructure – determining shared and enabling services; Business Application Needs – specifying the business need for purchased or internally developed IT applications; and IT Investment and Prioritization – choosing which initiatives to fund and how much to spend.

Weill and Ross found that, for most organizations, IT principles, IT architecture and IT infrastructure strategies should be primarily the domain of the IT function. Meanwhile the corporate centre and the business units tend to be much more involved, or even the primary arbiter on business application needs and IT investment decisions. This was particularly the case in highly competitive, dynamic markets, with the business driving for high growth and fast responses to the market. Here in fact the IT function may have few decision rights, and a 'Business Monarchy' may prevail also on IT principles, architecture and infrastructure decisions.

RPA initiatives walk straight into many dilemmas here, especially in contexts where IT executives are nervous on having few decision rights in areas for which they feel responsible and exposed. But the actual clear answer emerging from the cases we have studied is that, to be organizationally effective, RPA needs to enter the existing IT governance processes for all five decision areas *as soon as possible.*

Skills Sets

Once we have navigated through the misleading vocabulary (see above!), the skills sets needed to deliver RPA, and build RPA into an enterprise capability, seem intuitive and well known. We will deal with these in more detail in the next section, but they need to be initially a combination of business process reengineering, lean development, business change, operational skills, business analysis, and IT development and IT audit skills. Subsequently, as RPA grows, RPA may well become a Centre of Excellence in the organization, with, in large corporations, some distinctive capability in the business units utilising RPA. In all cases it will have good links with the IT function.

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Organization

The organization challenge – where to locate RPA – was one of the lesser problems emerging from our research. We found building skills sets and capability much more important influences on levels of success. We conclude that it is not crucial where RPA sits in the organization structure, though symbolically, it is probably best located outside the IT function and within Operations or the business units whose processes have been automated. In truth, we found a variety of organizational arrangements, which we will map in more detail below, together with the rationales for them, but none of the arrangements we saw seemed to detract from the effective usage of RPA.

In Practice: RPA governance fits within existing IT governance or may evolve to a Center of Excellence

On governance we found various approaches, depending on the history of IT in the organization, whether existing governance structures could continue to fit RPA decisions and management within them, and the understanding and maturity of RPA in the business at any one time. Most RPA adopters manage to fit RPA within the existing governance structure, then evolve the governance as RPA expands into new business processes and across the business units. In the early stages of adoption, though business-led, RPA is often small, seen as tactical and fits comfortably within existing governance processes. Thus at Leeds Building Society:

'Irrespective of where the activity is across the Society, whether it's just regulatory, process or systems, the project portfolio is managed through IT. So as soon as the RPA pilot was agreed in the middle of 2014, IT provided the structure and the support in terms of making sure that the pilot progressed against the project objectives and milestones. So RPA fitted into the normal governance structure.' — Kevin Mowles Head of Business Support, Leeds Building Society.

On skills sets, there was more common agreement across our successful RPA adopter cases, and we shall codify the findings below. On organization, we found a variety of practices. For example, The University Hospitals Birmingham NHS Foundation Trust started from within IT function and kept it there for over eight years. Xchanging started in Operations but with a strong relationship with their IT department. A major utility experienced some problems with locating it first in Operations, but subsequently kept it there while developing a strong relationship with the IT department. As Patrick Geary of Blue Prism confirmed from his own client experiences:

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'Not everybody does it in the same way. Some have more of an IT bias. One of our clients has a centre of excellence which sits entirely in IT with some business support. You have other organizations that are virtually all the business with a small amount of IT and then you have ones that sort of sit between the two.'

Bringing skills sets and organization together, one interesting development we encountered was a global financial services organization that formed an RPA Center of Excellence (CofE) from the start. According to one of our respondents, they did so *'because they recognized the business value of RPA, but wanted to balance the need for speed and agility on the business side with control and governance on the IT side.'*

Clearly, the organization in question had learned a great deal from earlier implementations at other organizations. The CofE of nearly 30 people (mostly RPA developers) sits between Operations and IT, and contains a set of roles and responsibilities from the operations side and also the IT side. The CofE forms a cross-functional team with the clear objective of rolling out RPA automation on a global basis as quickly and as safely as possible.

Lessons From The RPA Case Studies

Having focused on challenges to the IT function, in this final section we bring together the learning and thinking available from our case studies and interviews, and point to effective practice and ways forward.[21] The central issue we address is: how do you balance the needs of IT in terms of governance, security, and resilience, with the business demand for quickly delivered, cheap automated solutions against pressing business imperatives such as better information, process improvement, improved customer service, the ability to respond to changing market conditions. From the IT angle: what do you have to put in place in terms of an operating model and functionality to evolve and support an Enterprise deployment of robotic process automation?

By way of overview, according to Richard Hilditch, Engagement Manager for Blue Prism working with Xchanging:

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'There are four key workstreams in delivering an automation capability. One is the infrastructure. The second is the operating model, the third is the training and the last one is the actual processes themselves. If you don't have the first three, then you can't deliver the last one.'

From an infrastructure point of view, the lesson is that the client does need to get strong engagement with IT. On the operating model, the further lesson is you do need to define the roles and create a new group. It is an organizational change to bring a robot team in, and a support group is needed to develop and manage the virtual workforce on a day-to-day basis. A lot of training can be done online with a mentor, but better still to have multiple developers who can learn off each other. On business processes to be automated, it is important to define these or their sub-sets and select the ones most amenable to robotisation before you start working.

However, we can suggest a more structured, detailed set of seven steps.

1. Establish Business-RPA alignment

This requires defining the RPA vision and the expected business benefits against corporate strategy. It raises the question of how far RPA is a tactical weapon, and the degree to which the intention is to evolve RPA into a strategic capability and asset. In our research cases we saw touted and delivered benefits that included increased efficiency and productivity, greater operational agility, reduced operational risk, enhanced IT governance, control and security, business insight? A sample of actual results from three cases was shown in Table 2.

Not surprisingly, RPA needs a strong business case to proceed.

2. Define the organizational design and the role of Head of RPA

We have seen RPA deployed successfully in decentralised, federated and centralized organizational and IT structures. What matters is deploying RPA initially in ways that fit with the existing structure and culture. However, be sensitized to the issues that arise in doing so. Deployed and organized in single, siloed business units, RPA will give quick wins but will not be scalable across the enterprise, standards can become fragmented and difficult to impose, and duplication of hardware infrastructure may result. In a federated structure low cost, scalable automations across multiple operations functions can be achieved using a central and standard platform. However, recognise that, if the model does not already exist, implementing centralized

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change and automation delivery management disciplines across multiple operational units can be problematic. A centralised structure has similar advantages as a federated one, and is a good model for RPA where a Centre of Excellence is already established in the organization. However, Implementing a Centre of Excellence culture in the organization is a material investment if the structure does not already exist, and, as with centralised IT structures and IT resources, capability can become a resource bottleneck.

RPA needs an institutionalised project champion responsible for managing and reporting on RPA benefit realisation to the Board. Ideally this will be called the Head of Robotic Automation for whom a detail role specification will be issued. Not surprisingly this will cover defining and delivering the Robotic Operating Model; acting as the internal evangelist for RPA; developing, managing and delivering on the demand pipeline for process automation; operational management of the virtual workforce; oversight of the technology platform; interacting with IT as required; managing third parties, and internal and external dependencies (e.g., change programmes, software and application upgrades etc.) to maintain business continuity.

3. Form an RPA Governance board to manage the demand pipeline and assess RPA opportunities

As will be clear from earlier parts of this paper, and the case study evidence, RPA governance must be in the hands of interested stakeholders who will include, at a minimum, the Head of Robotic Automation, IT representatives (responsible for managing inward and outward dependencies, and gatekeeping demand on RPA capability from IT) and business unit representatives (who as consumers of RPA services provided by RPA are responsible for managing alignment with business strategy, and accountable for RPA benefits case).

The RPA governance board will be accountable for demand management, demand generation, benefits tracking, continuous improvement initiatives, and forming a delivery steering point as a decision-making forum and escalation point for emerging issues and risks. Managing the demand pipeline sees the governance board managing and generating demand, assessing RPA opportunities, prioritising processes for automation, carrying out impact assessments, and scheduling and reporting on the delivery lifecycle.

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4. Agree the RPA delivery methodology, and the tracking of its correct use

The delivery methodology can be designed in-house, and adapted from a combination of how reengineering and IT projects are delivered. However some RPA vendors now offer a standardised methodology that can be adapted in-house, with the templates and policies the embedded in existing client change management methodologies. A standardised delivery methodology - that supplied by Blue Prism – is shown in Figure 8. One needs also to define the delivery management and tracking approach that ensures optimal usage of the defined methodology. The delivery methodology takes us from process management to defining, designing, configuring, testing and deploying the virtual robotic workforce while accomplishing demand management, operational support in relationship to technical infrastructure, IT security and IT governance.

Delivery Methodology – Key Deliverables

Delivery Phase		RPA Methodology Deliverables	
		Deliverable:	**Purpose / Description:**
Process Management		▪ Process Assessment / IPA	▪ Define, by process, the feasibility, scope, complexity, effort, and projected benefits
		▪ Business Case	▪ Translates the aggregated results of Process Assessments into a financial case and provides the inputs for project planning (i.e. effort and cost breakdown)
Delivery Management	Define	▪ Refined Process Assessment (RPA)	▪ (Optional) Provides further detail and clarification where required on process scope
		▪ Process Definition Document (PDD)	▪ Documents the current process at a keystroke level – forms the requirements for design
	Design	▪ Solution Design Document (SDD)	▪ Translates the set of PDDs into an over-arching design to minimise development effort and maximise object reusability
	Configure	▪ Release Note	▪ Delivers the Blue Prism Release Package into test (i.e. the output of process development)
		▪ Configuration Test Plan	▪ Generate conditions to test the functionality of the individual Business Objects, Components and Processes along with an initial end to end test
	Test	▪ Verification Test Plan	▪ Generate & document test conditions to ensure all relevant scenarios are captured. ▪ Step through cases in a controlled manor in the presence of Operational SME's
		▪ UAT Plan	▪ Controlled testing, gradually ramping up the volume based on successful completion, and starting with the processing of a single case
Operations Support	Deploy	▪ Operations Handbook	▪ Provides instruction, information and advice on the running of the specified automated process in a normal daily operational environment for those who will run the process
		▪ Operations Ready (Model Office)	▪ Provides an opportunity to walkthrough the process with all key stakeholders (controllers, Business, IT) to validate the process is ready for live deployment
	BAU	▪ Implementation Plan	▪ Outlines the approach, timetable and resources required for releasing the process into the production environment
Technical Infrastructure, Security, Governance		▪ Infrastructure Design	▪ Provides the architecture requirements and proposed solution for supporting the automations – this is a living document that will evolve over time
		▪ Security Policies	▪ Outlines the security policy and procedures that supports the Blue Prism Agility Program with input from Business, IT Security & Access Control departments
		▪ Database Governance	▪ Defines the approach for managing the archiving and maintenance rules to control the size and integrity of the database

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Figure 8: A Standardised RPA Delivery Methodology (Source Blue Prism, with permission).

5. Establish the RPA service engagement model required to support operational processes

With the correct support infrastructure in place, RPA optimizes the productivity of both human and virtual workforces. Operational support activities include referral and exception handling, business continuity, testing and deployment, systems support, process support and product support. The roles and responsibilities for such tasks need to be assigned across business unit, operational, RPA and IT teams as well as the RPA software provider.

6. Define the people, their roles and responsibilities, and provide the training they need for operating efficiently in the existing organisational structure.

The number of people needed for a strong RPA capability, even at Enterprise level is not large. However who those people are in the RPA delivery and support teams, their skills sets, and their ability to operate in a multi-disciplinary environment are critical determinants of success. An important part of this is choosing an optimal training/mentoring approach for each role from a mix of modules covering product induction, assessment, controller tasks, developer tasks, and support tasks.

Looking across our case studies, RPA needs distinctive operator roles. A Process Analyst leads Opportunity Assessments, and creates process definitions. A Process Developer will design, develop, test and support RPA solutions. A Test Analyst is needed to provide business process focused testing and auditing of the automated solution. A Process Controller administers, co-ordinates and controls the automated processes in the operational environment. A Service Analyst provides first line support for RPA production processes. Meanwhile at more senior levels we have found senior process controllers with expertise in all phases of the RPA development process and associated methodology plus hands ability in design, develop, test and support of the solutions. A Programme Manager is required to oversee the creation and ramp-up of RPA capability, while an Automation Manager manage RPA Capability to deliver new and support existing processes.

This terminology is indicative, and we have seen clients change the titling of roles, but the titling is less important than the substance and capability that the roles constitute. Note that these personnel will also work with IT support staff, and requisite business unit and Operations staff who will be assigned part or even full time to the RPA team.

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7. Define a scalable, low maintenance technical environment and associated growth strategy.

Each RPA supplier will provide/need different technologies, software and components. The key to building a sustainable RPA capability is to create a scalable low maintenance technical environment. An example of one is shown in Figure 9.

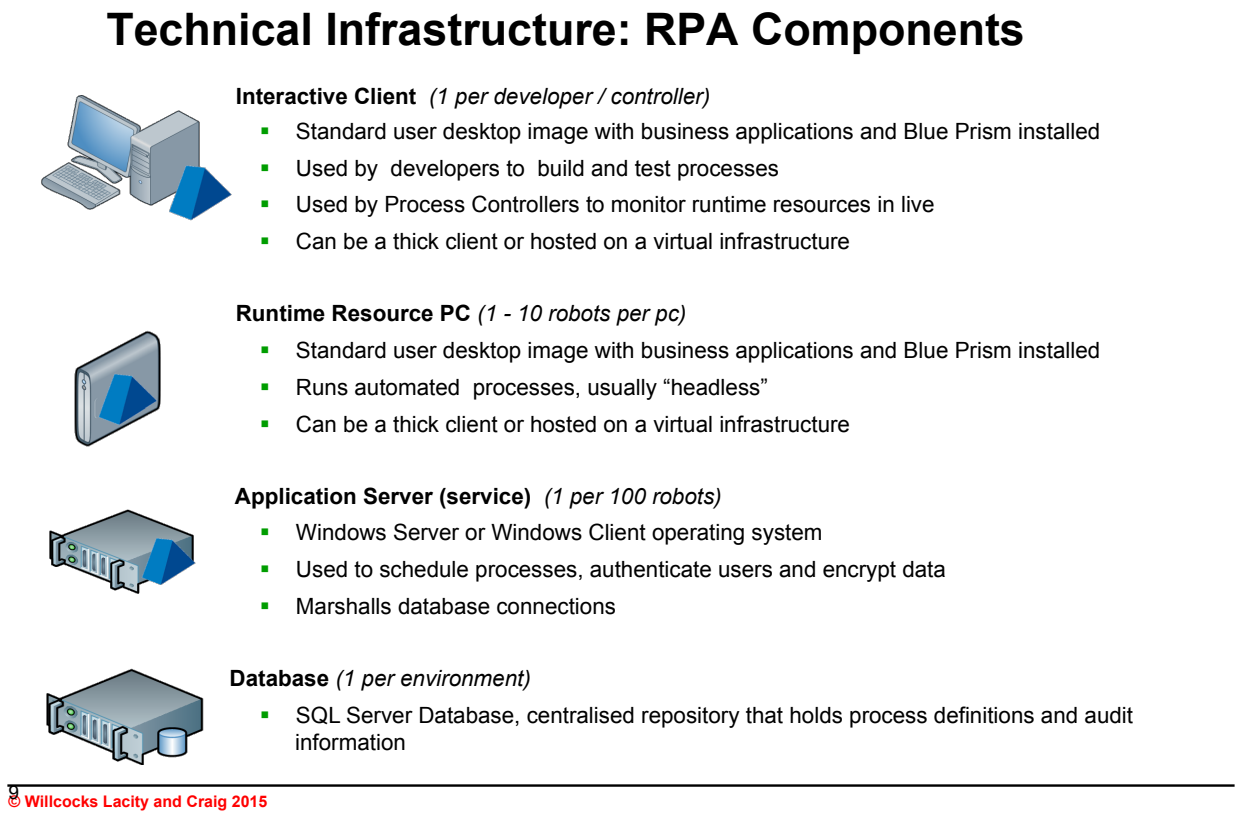

Figure 9 - Sample RPA Technical Infrastructure Components (Source: Blue Prism, with permission)

It follows from everything we have said in this paper that as lightweight IT, all RPA technology and fit with existing architecture, infrastructure and applications needs to be fully audited for security, risk, resilience, and business continuity in the event of technical issues.

8. Plan for Scaling

We found earlier adopters, seeing RPA first as mainly a tactical tool. As their knowledge and experience grew they sought to build their RPA capability and utilise it more widely across the

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organization. The sorts of growth we see in the organizations portrayed in Table 2, are in more recent RPA adopters, now planned for from the beginning. An important part of this process is first initializing RPA use and capability, building that capability so that success can be replicated and ramped up in new processes, then institutionalizing RPA as an Enterprise capability that can give differentiates performance of strategic value to the business. The case for this is made by a relatively recent client adopt of RPA:

'You need to apply the same sort of big Enterprise systems discipline to robotics automation tools as you do to anything else. And don't forget, they tend to be running on servers, so you need to really think about it in that Enterprise way. You need to consider Business Continuity and therefore Disaster Recovery. The business can and should drive the introduction of robotics, but really you need to think through what the long-term implications of scaling RPA usage in your organization are, and therefore engage the IT department' . – Adrian Guttridge, Executive Director, Xchanging Insurance.

Conclusion

With RPA there seem to be four top messages emerging from the case studies. Firstly, start with a foundation where you can build globally at an Enterprise scale. As one respondent put it: *'do not build a foundation for a bungalow. Build the foundations for an 80-storey high building'.* Secondly, make sure you have all of the stakeholders involved very early in the process, and ensure security, audit, governance, control, and IT oversight are covered. This will not slow down the ultimate adoption of the application. It will not cost money. But it means that if all the stakeholders are involved early on and the roadmap to success is drawn up based on these stakeholders' involvement, then the organization is going to be able to build a much more solid foundation and a solid business offering underpinned by resilient IT.

Thirdly, do not be tempted by quick wins, or service level or departmental solutions. This is something that needs to start as an Enterprise rollout. Even if it does not, in the end, become an Enterprise rollout, you have to begin with that concept.

Fourthly, if you do these three things, you can build around the RPA, for example at the front end for unstructured data, and later for insight through business analytics.

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The deeper you imbed RPA, the more touch points it can add value to. This fundamentally is the reason for thinking of and treating RPA as a platform rather than a tool, and as a programme rather than a one-off limited desktop application that gives a quick, but limited win on its business case. A tool, at the end of the day, is in the hands of an individual and as assisted (or attended) automation can give you some small gain, whereas an RPA platform represents an Enterprise capability, which, properly founded, the IT function supports, is comfortable with, and even leverages for its own purposes.

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Andrew Craig is visiting Senior Research Fellow at the London School of Economics and Political Science UK where he helped set up and now works in the Outsourcing Unit. He heads the IT leadership and governance stream of Carig Ltd and is also a director of Board Coaching Ltd. He has coached executives, teams and boards in the Defence Procurement Agency, the UK Border Agency, the leisure industry, Balfour Beatty, HSBC and finance and fund management companies. He is co-author of *The Outsourcing Enterprise: From Cost Management to Collaborative Innovation* (Palgrave, 2011). In his professional British Army career, as Brigadier, he directed the recruiting operation- an annual requirement of 16,000 people- and was responsible for Human Resource planning for a workforce of 120,000. He commanded engineering operations worldwide, including the first Gulf War and Bosnia, and led the UK's planned military response to nuclear, biological and chemical terrorism. He was awarded an OBE in 1992.

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Endnotes

[1] The most recent accessible summary of our research is in Lacity, M. and Willcocks, L. (2015) *Nine*

[2] According to HFS, the key characteristics of autonomics are self-learning and self remediation. See HFS Research (2015) *Autonomics Advances The Conversation Beyond RPA*, July, www.hfsresearch.com/autonomics. By mid 2015, TCS had announced its ignio "neural automation" platform, Ayehu has entered the market with confined capabilities at reduced licensing costs and Arago announced its international expansion out from its German roots.

[3] According to Cliff Justice of KPMG (2015) Cognitive RPA set to disrupt the knowledge worker market. June 25th www.kpmg - institutes.com, cognitive platforms have the ability to parse context and understand meaning like [IBM's] Watson [supercomputer] did in Jeopardy: *"As that technology merges with robotic task automation… you have technology that can understand your customers and run queries against rules engines. If the response falls within parameters, the technology can inform the robot to carry out a transaction and actually do things that in the past required decisions.'*

[4] Sutherland, C. (2015) Presentation on The Intelligent Automation Continuum at the *HFS Intelligent Automation Webinar,* August 27th, 2015.

[5] See Papers by Mary Lacity, Leslie Willcocks and Andrew Craig (2015) on *Robotic Process Automation at Telefonica O2* LSE Outsourcing Unit paper 15/03; *Robotic Process Automation at Xchanging* LSE Outsourcing Unit paper 15/03; and chapter on a major utility in *Willcocks, L. and Lacity, M.(2016) Service Automation: Robots and the Future of Work (SB Publishing, Stratford).* Significant benefits are also recorded by clients at three other major organizations we have researched so far, namely Leeds Building Society, University Hospitals Birmingham NHS Foundation Trust, and a major utility.

[6] See Willcocks, L., Venters, W. and Whitley, E. (2014) *Moving To The Cloud Corporation*, (Palgrave, London). Also Lacity, M. and Willcocks, L. (2015) *Nine Keys To World Class Business Process Outsourcing*. (Bloomsbury Press, London). Our research findings on evolving IT function structure and capability towards delivering strategic business value are summarized in Willcocks, L., Petherbridge, P. and Olson, N. (2005) *Making IT Count: Strategy, Delivery, Infrastructure.* (BH Press, Oxford)

[7] We found the high performers in IT in the lower spending range on legacy maintenance, and much more on creating digital platforms and innovating for the business. See Lacity and Willcocks (2015) op. cit. ; also Weill, P. and Ross, J. (2009) *IT Savvy: What Top Executives Must Know To Go From Pain To Gain*. HBS Press, Boston.

[8] See Cullen, S., Lacity, M. and Willcocks, L (2014) *Outsourcing – All You Need To Know*. (White Plume, Melbourne) for a summary of our research on different sourcing options, and a guide to emerging effective practice.

[9] See Willcocks, Venters and Whitley (2014) op. cit.

[10] Across 2011-15 we carried out three in-depth research projects into the cloud experiences and practices of 75 SMEs and large corporations in Europe, Asia-Pacific, and the US. See Willcocks, L. and Lacity, M. (2015) *Cloud Management: Where we are going and how to get there*. Parts 1 and 2 Business Technology Strategies, volume 8 nos 4 and 5, Cutter IT Consortium.

[11] Interview with Kevin Mowles, Head of Business Support, Leeds Building Society, July 21st 2015.

[12] This evidence for this claim can be found in our first three published case studies of RPA. See Papers by Mary Lacity, Leslie Willcocks and Andrew Craig (2015) on *Robotic Process Automation at Telefonica O2* LSE Outsourcing Unit paper 15/03;

[13] See papers by Mary Lacity, Leslie Willcocks and Andrew Craig (2015) on *Robotic Process Automation at Telefonica O2* LSE Outsourcing Unit paper 15/03; *Robotic Process Automation at Xchanging* LSE Outsourcing Unit paper 15/03; and chapter on a major utility in *Willcocks, L. and Lacity, M.(2016) Service Automation: Robots and the Future of Work (SB Publishing, Stratford).*

[14] See Gozman, D. and Willcocks, L. (2015) *Shadow Boxing Clever.* Professional Outsourcing Magazine, 21, Summer, pages 36-45. Properly implemented, in fact RPA can positively assist regulatory compliance.

[15] One problem mentioned was crashing applications by crowd swarming systems of record. This can occur because users apply their own passwords and IDs. As stealth IT, the robots do not have their own IDs or own permissions so do not identify themselves as robots to other applications. Screen scrape

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encrypting tools, often labelled RPA, tend to be unmanaged and uncontrolled. This introduces new risks into an operational IT architecture, and raises multiple issue including security, resilience, performance, impact on underlying systems, change control, and user permitted access rights. When sold as part of an outsourcing contract, they create a further latent problem at the end of the contract in that the software tends to be written in freeware code that is non-transportable to another service provider or the client.

[16] Bygstad, B. (2015) *The Coming of Lightweight IT.* Proceedings of the ECIS conference, Munster, May.

[17] See Cullen, S. Lacity, M. and Willcocks, L. (2014) *Outsourcing – All You Need To Know.* (White Plume. Melbourne), chapter 13 for a detailed account of how to deliver business process innovation projects.

[18] See Willcocks, L., Feeny, D. and Islei, G. (1997) *Managing IT As A Strategic Resource.* (McGraw Hill, Maidenhead). Also Willcocks, Petherbridge and Olson (2002) op. cit. Chapter 8.

[19] See papers by Mary Lacity, Leslie Willcocks and Andrew Craig (2015) on *Robotic Process Automation at Telefonica O2* LSE Outsourcing Unit paper 15/03; *Robotic Process Automation at Xchanging* LSE Outsourcing Unit paper 15/03; and chapter on a major utility in *Willcocks, L. and Lacity, M.(2016) Service Automation: Robots and the Future of Work (SB Publishing, Stratford).*

[20] Weill, P. and Ross, J. (2004) *IT Governance. How top performers manage IT decision rights for superior results.* Harvard Business Press, Boston.

[21] This section draws upon 27 formal interviews, and 25 further less structured discussions with clients, RPA service providers and advisors. It also draws upon Blue Prism's Enterprise Robotic Process Automation Model, and the learning it embodies to October 2015 from working with over 100 clients on RPA development.

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