WHITE PAPER: Automation – Here We Go Again?

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Automation has long been a topic of interest within Information Technology as the general perception that a significant proportion of IT tasks are essentially repetitive and, therefore, ideal candidates for some form of automation. Despite the belief that many tasks can be automated, in many IT organisations there is actually only a small proportion of tasks that are. This White Paper explores the history of automation, how it impacts the workforce and examines the impact of human factors in a bid to determine why IT is one of the slowest adopters of automation compared to many other areas of business.

Automation software and even hardware such as robotic tape changers have been available to IT Operations for many years but attempts to automate operational procedures has fallen short of removing the human element completely. One of the primary reasons for unsuccessful implementations of automation solutions has always been the inconsistency with which IT environments are created. With the advent of more Software as a Service solution, vendors are building much more consistent environments and then achieving significant operational benefits automating many of the underlying administrative processes.

In contrast, many internal IT Departments haven't attained this level of consistency and, therefore, automation is correspondingly difficult. The need to create automation solutions that are both highly flexible and yet capable of complex processing means that the investment required for a complete automation solution is often above the recognisable return from removing certain human aspects. One of the most obvious candidates for end to end automation in most IT Departments is the provisioning of a new user or the removal of a leaver and yet it is a rare IT Department that achieves this with no human intervention despite the fact that software capable of delivering this has existed for years.

The cloud, be that public or private, SaaS, IaaS, PaaS or anything aaS, is driving a fundamental change within IT Departments as many of these external sources of software and platform employ high levels of comprehensive automation to deliver services more effectively and efficiently. As the internal IT Department embraces more of these there is a clear need for a level of automation to connect users, data, networks and security between the different systems. If these connections are not automated,

or orchestrated, the manual equivalent processes will end up slowing down many of the processes that the vendors have invested time and effort in automating and the spotlight will fall on the IT Department as the blocker in the efficient operation of the business.

This White Paper examines all aspects of automation and illustrates that attaining effective automation is not about software or solutions but rather it is about creating an effective alliance between people, process and accountability. Successful automation is essentially a people-centric programme of change.

A Brief History of Automation

Automation has a long history with periods of very slow evolution punctuated by rapid cycles of revolution which in turn has resulted in a greater examination of the phenomenon and its impact on our world. Until relatively recently, automation has been broadly tagged as any process that improves the productivity of labour. From the introduction of machines that displace human labour to the assembly line that first improved human efficiency and then replaced much of the human efficiency with robots, automation has been focussed on speeding up and making consistent repetitive activities and processes.

There is often confusion over the nature of automation, with some describing automation as any process that displaces human labour with others, at the opposite end of the spectrum requiring that automation requires no human intervention in the selection and identification of appropriate action[i] and the ability to anticipate required action and automatically make adjustments for it. This is the closed loop process, where there is no human interference from the start to the end of the process.

It is closed loop processing that has undergone the most radical developments as, until recently, the rhythm of most automated processes is still under human control and there is still a need for human observance and intervention in the event that there is a failure or an unexpected event in the automated process.

Because of the limitations of automation, one of the underlying issues has always been that the process or operation being automated must be essentially repetitive and predictable to avoid the requirement for human interaction. However, with recent developments in Artificial Intelligence (AI), new systems being developed allow autonomous robots to learn from mistakes and adapt their behaviour to changing external influences. Researchers at the University of Texas have patented a technique that

allows software to learn from mistakes and adapt processes instantly. In essence, the software is able to 'see' what is happening in near real-time and to make rapid adjustments.

The process, which has been termed 'Integral Reinforcement Learning' (IRL), means that robots will be better able to cope with unexpected events that they have not been programmed for, and this opens up a new set of possible applications for automation as it removes or reduces the need-dependency on the human aspect of a process.

A recent report suggested that developments such as IRL will revolutionise many white collar roles, with some analysts[ii] suggesting that 94% of paralegal work within the legal sector will be capable of being undertaken by robots using AI within 20 years. These robots will be capable of processing highly sophisticated algorithms at phenomenal speed and will have direct access to vast stores of data to feed these algorithms to allow them to execute relatively complex low-level knowledge worker tasks.

The Jomati report concludes that the future of work contained the most disturbing findings for lawyers. Its main proposition is that AI is already close in 2014. "It is no longer unrealistic to consider that workplace robots and their AI processing systems could reach the point of general production by 2030… after long incubation and experimentation, technology can suddenly race ahead at astonishing speed."

There are a number of significant implications of the surge in automation that is both here and arriving in the near future. The impact on humans within the work-place, the economic and social implications and the safety considerations of depending on automation are all worthy of debate but there is also the impact on Information Technology as we currently understand it. What changes will IT need to make to adapt to this new era? How can these developments be leveraged within IT? And, because of the significant human impact of automation, how IT can properly engage with Human Resources to ensure that the human impact is a positive one.

Automation and the Workforce

There is a current and entirely polarised debate that revolves around the future of the global workforce in the face of a seemingly irresistible wave of automation that is sweeping across the World. On the one hand are those that see a mass rise in unemployment as technology embraces an ever-increasing number of roles whilst on the other are those that believe that, although some traditional roles are being eclipsed by technology, many more but different roles are being created.

A 2014 nationwide survey by CareerBuilder in the United States showed that 21% of over 2,000 firms polled have de-skilled workers i.e. they have replaced these roles with some form of automation. However, whilst eliminating these roles, the majority of companies (68%) indicated that the introduction of the automation technology created new roles within their organisation with 35% of firms admitting that they created more jobs post-automation than existed prior to the automation. The over-riding reason given by this latter group was the failure of the automation technology to deliver the expected results.

The continued growth of the internet has resulted in a hugely negative impact on jobs in specific sectors. For example, in the US between 2002 and 2014, 38,000 Travel Agents jobs were eliminated but during the same time the number of Software Developers and Web Developers increased by 195,000.

There is a similar trend in data automation with 43,000 Data Entry Clerk roles vanishing between 2002 and 2014 but an increase in Market Research Analysts, those who interpret the data, of 99,000. In essence, the profile of the job market shifting and, to this point at least, showing increased demand for people. The biggest challenge, however, is delivering appropriately skilled people to meet the requirements of the changes that we are now facing.

The effects of automation are affecting different business sectors at differing rates with Customer Service (35%) and IT (33%) expecting the greatest impact but other areas such as Accounting and Finance (32%) and Assembly/Production (30%) expecting a second wave of effect after large scale automation in earlier evolutions. However, low and high skilled jobs are less vulnerable to automation and so it is the mid-skilled and professional roles that are at greatest risk in the current automation revolution.

Low skilled jobs are generally regarded as least vulnerable at present as there is a sufficiency of human labour willing to undertake much of this work for less cost than the initial investment in automation and subsequent return on this investment. High skilled jobs usually include a high degree of human accountability and, therefore, are unlikely candidates for automation. The effect of automation in removing many of the mid-skilled jobs is often referred to as 'Job Polarisation'[iii]

As many mid-skilled jobs have already been automated, such as Travel Agents and Data Entry Clerks previously described, there is now a shift towards the automation of professional roles such as lawyers and accountants. As described earlier, there is serious concern about the impact of automation in the

legal sector, with up to 94% of paralegal work being viewed as capable of being automated within 20 years. Whilst this automation, using AI and robots, will allow for significant performance increases in this lower level work, it will bring with it a myriad of other issues that require to be addressed, not least of which is that robots will be executing much of the work that has been previously undertaken by lawyers during their training contracts and used to ensure they understand the fundamentals of their chosen profession.

Trainee lawyers (and accountants and other professionals) typically gain the core of their practical experience serving an apprenticeship through these lower level activities so that they have a true understanding of the mechanics of their profession. If these activities are automated, how will the future lawyers develop and gain that understanding? The issue is that the automation is becoming increasingly available but the industries are not able to adapt their educational paths. This story is true of the majority of professional sectors, where a significant proportion of the work is, in essence, automatable, but this very work is the basis upon which the professionals build their knowledge in the first place. The value of any automation must be considered very carefully within the wider context of other roles that the functions to be automated perform.

Thus, whilst the higher skilled jobs that currently exist may well not be candidates for automation, primarily because of the need for human accountability, the route by which people attain the skills to be able to fulfil these roles in the future is under threat through the automation of significant elements of the apprenticeship process.

Many economists believe that the quantity of work that can exist is infinite but that machines can already do much of the 'easy work' that is available. As technology develops, the definition of 'easy work' extends to cover more of the tasks and processes and, therefore, the work that is left is becoming intellectually and cognitively more difficult which, in turn, reduces the available pool of humans available to complete it. Thus, increased automation is likely to result in larger scale unemployment as re-training to the cognitive levels required for the remaining work will simply not be possible for the majority of the work-force who have had their roles automated.

However, if we assume that people can develop the necessary cognitive skills and we emerge into a new World of working where the overall nature of work has changed there is still a tacit dependence on people then being able to consume the output of these new jobs, be this output physical or simply information. There is a danger that, in an attempt to create jobs, people will end up creating solutions to 'problems' that may not even exist but are invented to create jobs.

Many of these new solutions will further automate the World by removing many of the mental tasks that humans perform on a daily basis. We have already replaced physical maps and the application of planning skills with typing post codes into Sat Navs and blindly believing the route and estimated time. As similar smaller tasks are automated, many of them unnecessarily in an attempt to solve the declining job market, humans will become more mentally apathetic and seek more and more applications to make basic decisions on their behalf. Rather than enhancing the overall level of cognitive awareness of humans, it is possible to see a cycle of activity that reduces cognitive skills in humans still further and thus creating larger scale unemployment than is already predicted.

Eric Schmidt, executive chairman of Google appears concerned, saying "the race is between computers and people and the people need to win ... In this fight, it is very important that we find the things that humans are really good at". The good news is that there are many unique talents that humans possess and will not be possessed by machines. Geoff Colvin[iv] is confident that, regardless of what computers achieve, the greatest advantage humans possess arises from the elements that define the human animal: empathy, creativity, social sensitivity, story-telling, humour, building relationships and leading.

Colvin regards these skills as extremely high-value and capable of offering exceptional competitive advantage as culture binds people and creates more devoted customers as well as establishing a productive environment for ideas and effective teams. In short, humans will never compete effectively with computers at the tasks computers can execute. However, if humans focus on the inter-personal experience in every aspect of life and combine this with technology, the future becomes significantly more positive.

The one other aspect that will not be capable of automation is the accountability for decisions made. For example, Judges assessing the law and making decisions will always require the burden of human accountability otherwise we will find ourselves in the position of a software developer having created code being held accountable for every outcome of the automated response of this code to particular inputs.

Automation and the Human Factor

If we examine the concept of accountability further, the increased dependency of humans on automation and the resultant de-skilling of humans is an area where there is significant research that invariably reaches the conclusion that many cognitive and physical skills degrade when not frequently

practiced in 'real life' conditions. For example, recent research by the Federal Aviation Authority (FAA) examining the impact of flight deck automation in modern aircraft indicates that while automated systems have improved safety in general, pilots rely too much on them and become confused by auto-flight modes and 'may be reluctant to intervene' when faced with a confusing, automation-related situation[v].

Automation-related errors have been implicated in a number of recent airline crashes, including the 2009 loss of Air France Flight 447 where it is believed that an inexperienced co-pilot did not know how to react to an auto-pilot failure and by the time the captain returned from a rest break it was too late to take appropriate action. Research undertaken at Cranfield University in 2007 illustrated a close connection between a pilot's adeptness at the controls of a simulator and the number of hours the pilot had recently spent manually flying a plane. The conclusion of the research, that 'flying skills decay quite rapidly towards the fringes of tolerable performance without relatively frequent practice' is concerning as computers now handle most flight operations between take-off and landing and so 'frequent practice' for pilots is rare.

One option that has been suggested to address this issue is to create algorithms within the automation software that shift control back and forth between the pilot and the computer during a flight to keep the pilot active and alert throughout. This may appear counter-intuitive to the view that designers frequently see automation as a way to increase system efficiency and safety by reducing human involvement but it is becoming increasingly accepted that the role of people becomes more important as automation affects more aspects of our lives. However, re-engaging the human aspect is vital because, for automation to fulfil its promise, designers must avoid a technology-centred approach and adopt an approach that considers the joint operator-automation system[vi]. It is clear that automating processes or tasks changes the nature of feedback received by the human in the process and this affects the human's cognitive and behavioural responses which can result in failures in the automated environment.

The need to develop automation in conjunction with the human element has long been recognised. When the automation of assembly lines was first introduced, the initial attempts were based on the principle of taking any task and breaking it down into the smallest operational components so that workers were not required to apply any intelligence to their tasks[vii]. This view prevailed and when increasing automation was applied to American factories, workers were explicitly prevented from halting the assembly line in the event of a problem. This privilege, as it was seen, was granted only to

supervisory staff. The overall result of this approach were low levels of productivity and a reduction in quality of the end product.

In contrast to this, Japanese assembly line workers were allowed to stop the production line when they believed there was an issue and, in a very radical step at the time, formed 'quality circles' where workers were encouraged to discuss and comment on the performance of their tasks. This approach was based on Mayo's Hawthorne Effect[viii] and resulted in significant improvements in productivity and quality. This approach was further improved with the introduction of group assembly which was first introduced in Sweden and then adopted in Japan and the Americans. This approach delegates responsibility for the entire product to a small group of workers and allows a small group of highly skilled workers to very efficiently use increasingly automated systems to create a product for which they are ultimately accountable.

Returning to the idea of "skills fade" identified by the FAA, Hubert Dreyfus wrote that human expertise develops through "experience in a variety of situations, all seen from the same perspective but requiring different tactical decisions" meaning that we need to regularly use our cognitive abilities to address different difficult challenges. The danger is that human cognitive ability fades when not challenged but the increasing automation of more and more everyday tasks results in less and less use of these abilities. A study at Utrecht University split a group of people into two groups, providing one with rudimentary software and one with sophisticated software to execute complex analytical and planning tasks. They found that the group with the rudimentary software developed better strategies and developed a stronger aptitude for the work whereas the people using the more sophisticated software would often 'aimlessly click around' when facing more complex issues. Their conclusion was that the more sophisticated software actually short-circuited the cognitive development processes.

When software takes over, manual skills wane. In his book "The Thinking Hand," the Finnish architect Juhani Pallasmaa argues that dependence on computers makes it harder for designers to appreciate the subtlest, most human qualities of their buildings. "The false precision and apparent finiteness of the computer image" narrow a designer's perspective, he writes, which can mean technically stunning but emotionally sterile work.

The human factor and the impact on automation has always existed and, in several cases, defeated some of the predictions about automation encroaching more and more aspects of the World. With the massive increase of the use of technology within offices and the automation of many of the tasks that were previously undertaken by clerical staff, there was a belief during the 1990s that many of the

remaining knowledge workers would be able to remain at home accessing the information that required from their home based office. The automation of information production and the ubiquitous access that communications technology provided would render the manual process of attending an office unnecessary.

Although there is an increase in the number of people who work permanently from home, the rise in these number is not as significant as was originally expected. Social psychologists explain this as the 'social animal' nature of humans who enjoy the companionship of an office compared to the relative isolation of home working. The rise of social technologies, far reaching though they are, will never entirely replicate the spontaneous nature of physical social interaction. Companies too are recognising the value of having people in a single location. In 2013, Yahoo banned its staff from remote working citing that "some of the best decisions and insights come from hallway and cafeteria discussions, meeting new people, and impromptu team meetings". It seems that Colvin's view of the highly-skilled nature of group is enhanced by interaction with other people in a group, especially an unstructured group. In essence, the highest functioning human group is a collective that promotes spontaneity which is one aspect of life that is unlikely to ever be automated.

How does this assessment of the human factor translate into IT operations terms? In the modern IT department, many systems are entirely automated, and necessarily so because of the huge volume of checks that are required in modern IT environments, it is vital that the IT staff understand what is behind every monitor and why it is undertaken. Without this critical knowledge, how can staff be expected to react rapidly and effectively when the alarms begin to sound? An old Chinese proverb says "tell me and I'll forget, show me and I may remember, involve me and I'll understand". If staff exist in a highly automated World, the opportunities for involvement are extremely limited until there is a requirement outside of the automated element and this, by its very nature, will be a remarkable event of which the human will have limited direct experience.

Human Centric Automation

To negate the negative impacts of automation and to avoid the potential economic disasters that would accompany the replacement of human workers with machines there needs to be a new approach to the development and implementation of automation. The Closed Loop approach of removing the need for human interaction needs to be replaced with the Decision Loop approach where there is a continuous process of action, feedback and judgement-making.

This approach switches the emphasis of the automation from being a replacement for a human to becoming a partner that exists to execute routine tasks but provides feedback and information that maintains the involvement of the human operator and allows them to maintain a fresh perspective on the automated activities.

The railway industry[ix] have clearly identified that 'automation is not a desirable end in itself' but rather it is a solution that can assist in achieving both operational efficiencies and safety. The industry strongly believes that it is the integration of automation and humans and how the two elements interact to enable knowledge sharing and mutual support that must be more clearly identified before any wide scale automation can be developed and implemented.

Despite this apparently conservative approach, it was railways that adopted automated navigation on the London Underground in the 1950s, using plastic punch wheels and metal pin conductors to create very early, but highly reliable recording and playback mechanisms for automatic train systems. This has evolved into the driverless trains that operate on the Docklands Light Railway and there are many more plans afoot to examine how far automation can evolve. However, having taken a leaf from the airline industry's book, the industry recognises that 'automation solutions which will deal optimally with all possible situations cannot be completely specified' and so constant human interaction is required.

So automation should only be implemented where the technological capability, the understanding of the system and the ability to address related human factors are robust. Many of the more successful implementations of automation have been where an organisation has seen the opportunity to use the automation exercise to also drive change within the human behaviour within the organisation. Automation requires that the human components within the process learn to 'row together' because the automated element is essentially unrelenting and will continue in the pre-defined direction irrespective of the human factor. If the humans are not also moving in the same direction in unison, then the value of the automation is, at best, diluted and, at worst, destructive as in the examples of the US motor industry examined earlier.

In his book "The Five Dysfunctions of a Team"[x], Patrick Lencioni summarises the issues faced by teams as they seek to 'row together' and cites an absence of trust, fear of conflict, lack of commitment, avoidance of accountability and inattention to results as the five factors which, when dysfunctional, will effectively disable a team. Where an organisation is seeking to implement large scale automation, these dysfunctions may completely negate any benefits that the automation may provide.

Thus, it is clear that automation is not a desirable end in itself but rather a tool that, if appropriately applied, can assist in achieving improvements in both operational efficiency and safety. That is the real objective. In the current world, the IT Department will drive many of the automation activities within an organisation but they will only succeed if they understand and can also drive the implementation of the human factor, either as an embedded part of their project or in conjunction with other departments such as Human Resources.

The current and short term future development of automation is delivering options that have not been considered previously and, in many ways, the human centric development of such solutions is a great unknown so that current IT Departments need to leverage the learning from other automation waves that have preceded the current wave.

There are many lessons to be learned from automation in previous iterations, such as the Toyota Way[xi] which, when applied to the motor industry, resulted in a highly effective automated production approach with high productivity and also high quality output. The Toyota Way approaches automation through the engagement of the human element of any function as critical to the success of automating processes and imbues the introduction of kaizen (change for better or improvement) into the process. Kaizen[xii] is a daily process, the purpose of which goes beyond simple productivity improvement. It is also a process that, when done correctly, humanises the workplace, eliminates overly hard work ("muri"), and teaches people how to perform experiments on their work using the scientific method and how to learn to spot and eliminate waste in business processes.

Encouraging people using the automated processes to constantly seek to improve them and removing the fear of failure from experimentation means that the automated processes constantly evolve and there is no fear about automating more and more processes as the workers are continually developed so there is no inherent fear of automating yourself out of a job.

Automation and Information

One of the by-products of the increasing automation of data collection and analysis is the parallel increase in the volume of information that is being created. In their report *The Digital Universe of Opportunities*[xiii], EMC state that global data volumes are doubling every two years and have predicted growth from 4.4ZB in 2013 to 44ZB in 2020.

The internet currently has over 4.75Bn searchable web pages and anything up to 500 times that in the Deep Web. The sheer volume of data and information that is available on the internet alone is in danger of swamping the World and significantly reducing the level of efficiency that the data was originally intended to enhance and the growth of data available to people outside the internet only compounds this issue further.

In fact, he increase in information has spawned a whole new area of automation, being the analysis of the information using Artificial Intelligence whereby machines examine and contextualise data and provide the end user human with a series of validated options. This is resulting in an increased dependency on the automation components and, perhaps more worryingly, creating a potential situation where humans are devolving many mental decision-making tasks to automated solutions.

This increased devolution can lead to a number of different issues: there is an increasing trust in the information provided, with less inclination from the ultimate end using human to question it. Perhaps not as extreme as Isaac Asimov's observation in the 1980's, "All sorts of computer errors are now turning up. You'd be surprised to know the number of doctors who claim they are treating pregnant men", but there are many notable instances of humans making critical decisions based on recommendations by automated solutions.

There is currently a great deal of debate around the use of Artificial Intelligence within many systems, not least being the embedding of Virtual Assistants into many smart phones, with these assistants being intended to provide us with relevant information when we need it. These solutions gather information about behaviour, location, habits, relationships and preferences and combine with this information surrounding us such as traffic conditions, weather or other events to provide highly contextualised systems. These assistants are also capable of effectively understanding natural language and, along with access to a range of analytics tools, can better make sense of our requirements and predict needs.

It is claimed that this AI will make sense of the information over-load that many people are currently experiencing and will ensure that information will be at hand when we need it, often without us having to ask. Ultimately, it is claimed that Artificial Intelligence will anticipate our needs and start offering solutions before we have even identified a problem.

Google have recently become involved in a project to develop software that can discover patterns in data and automatically create concise reports for the information consumers[xiv]. The 'Automated Statistician' has been created with a large number of different statistical techniques that can be used

in different combinations to allow highly complex analysis of vast volumes of data. Alternatively, the software can be allowed to self-select the analysis model deemed appropriate for the nature of the data presented. The software is only capable of examining the data itself and is still reliant on human interpretation of causal factors within any information. Although the current iteration creates reports that predominantly related to mathematical models, it is unlikely to be long before the next wave of development applies AI to this intermediate information and delivers a business case type report automatically.

The use of automation to examine and analyse data to transform it into information that is of value is an area that will require close involvement of the IT Department who will need to work closely with the consumers of the information to determine their needs and also to identify and collect all of the original data into a form that is accessible by the AI tools that will execute the transformation activities. With the proliferation of data and data sources, this latter task will itself require a high level of automation to enable the speed of response required by the information consumers. The IT Department will also have to identify, implement and manage the analytical systems that transform the data into information.

As discussed earlier, there are inherent issues with full scale automation of processes, not least of which is the concept of accountability for the outcome of the process. However much an automated process is tested, if there are issues with the raw materials, in this case the data, then the resulting analysis has a high potential for error. The term 'Garbage In, Garbage Out' has existed throughout the emergence of IT and is equally, if not more, relevant today. Having clear lines of accountability for the quality of the input, the adequacy of the processing and the resultant output is a vital component of the automation of this process, especially as the increasing speed of such processing creates great strains on the management of the various components of the systems.

IT Departments need to adjust to enable them to deal with this new wave of data identification, systems management and information delivery. For those IT Departments that have adjusted to the initial waves of Big Data, the automation process may be easier if the existing mechanisms are robust and standardised but for many IT Departments the automation of information creation will require a significant change in their operational behaviour.

In order to adapt to these additional requirements, the IT Department will also need to adjust to accommodate the on-going view of the business that standard operational costs should be reducing as

more IT functions become commoditised. The adaptations needed to accommodate these two seemingly conflicting requirements are discussed in more detail below.

Conclusion

Having examined the development of automation and the impacts of automation on the human state and both the positive and negative and negative perceptions and impacts of automation, it is clear that automation is not a solution in and of itself. As Bill Gates observed when questioned on the value of automating as many IT operational procedures as possible: 'the first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency'. In short, automation without examining the underlying activity will achieve nothing.

The IT Department is not only an integral component of the delivery of automation across the business but must also examine their own operating procedures to determine where cost and time savings can be made. It can be argued that the IT Department is in the centre of two opposing forces that are both bearing down on it: the need to deliver faster more complex solutions to the business often using new and emerging automation technology whilst reducing operational cost and complexity within their own function. IT Departments that can succeed in addressing both of these conflicting needs will truly become an integral element of the business, capable of delivering enhanced business capability whilst reducing the cost burden on the business for more commoditised services.

IT itself should be one area of life where high levels of automation are possible and also the one area within an organisation where the expectations of automation delivering services to end users rapidly are highest. Business owners need agility to respond to opportunities and threats in the current markets and, with many business change initiatives requiring IT, this need for agility and speed is passed straight through to IT. For IT to meet this requirement there is a clear need, among other elements, for automation within the IT Department.

However, having identified a need for automation, it becomes more difficult to determine how that automation should be applied and to what aspects as IT must balance the normal operational requirement of maintaining existing services whilst creating an environment that is capable of delivering the speed and agility required by the business. Allied to this, there is the constant downward pressure on IT Operations budgets as the business constantly expects IT Departments to deliver 'more

for less' as the general perception is that the more commoditised elements of IT are reducing in unit cost.

Examining internal IT Operations first, IT has been attempting to automate internal functions for a number of years and for the past five years 'IT Automation' has appeared within the top priorities for CIOs across most industries and geographies. However, in many organisations there are legacies of failed or incomplete attempts to introduce automation within the IT Department. There are a variety of reasons cited for the failure of these attempts but generally they may be analysed into five primary reasons for failure[xv].

Perhaps the most common cause of failure is that IT Departments seek to implement a tool set instead of recognising that automation is primarily about people, process and accountability and that IT must adopt a human-centric approach to automation for it to succeed. Poor stakeholder management is also a big factor as the people being asked to support the implementation are least likely to be interested in it. Allied directly to this is the concept of asking the people who perform the tasks to engage in automating them as they will ultimately be automating themselves out of a job. These human centric aspects can be addressed with careful planning but these are different planning skills than exist in most IT Departments and so the use of specialists, quite often external specialists, will significantly enhance the chances of success. Once complete it is also a wise idea to augment the IT Department with an automation specialist, a role that will exist solely to identify and implement future automation projects and who will understand the human, process and technical aspects of the exercise.

The final reason many automation projects are defined as a failure is that the criteria for success are poorly defined. Automation is all too often perceived as being intended to remove as many people from a process as possible and for that process to somehow magically work of its own accord. As shown repeatedly throughout this white paper, the true metrics of success may include increased productivity per person but should also include speed of delivery and quality of delivery both of which have tangible cost benefits but not necessarily in the simple reduction of the IT Operating Budget. Infrastructure and Operations costs represents around 60% of IT spending[xvi] and 45% of CIOs expect their budget to increase in 2015[xvii] so at this point there seems little belief that automation will reduce the operational costs of IT but if it can be used to eliminate time to delivery and improve the quality of delivery, the financial benefits will be realised throughout an organisation.

Automation of IT Operations is rarely a single monolithic project and nor is it one that succeeds when delivered as multiple small projects within each IT Operations function. Much of the manual effort and

lapse time within IT Operations is derived from the transfer of activities between functions and so, when reviewing processes as candidates for automation, IT Departments need to examine a process from end to end, including cross-function transfers. Examining the process in this way will allow the identification of any constraints not only within each function but between functions as delays and increased lapse time often exist when work is handed between functions and if this is to be automated, any limits that exist in the handover process require to be identified and eliminated.

Examining each of the processes also provides an opportunity for questioning whether an internal process should exist at all. There is little point in investing in automating a process that when critically examined can be seen as a process that can be delivered through another mechanism. The rise of cloud computing provides IT Departments with an opportunity to leverage the automation already created by most cloud providers without having to deliver it internally. One of the primary reasons organisations are adopting cloud strategies is to provide extensible capacity for their own infrastructure so that acquiring additional compute power is not the bottleneck in operational activities but the efficient adoption of cloud as an elastic compute resource is dependent on the connection of internal IT Operations processes with the automated provisioning processes of the cloud provider and this is becoming another key driver to internal IT Department automation.

Wholesale cloud adoption could be seen as one option for driving significant automation across an IT Department as they would simply leverage all of the automation tools provided by the cloud vendor. There are widespread debates about whether there are true cost savings to be derived from adopting cloud based services[xviii] but many of the debates ignore the impact, both actual and potential, of automation within the IT Operations function in delivering and managing the cloud infrastructure. The automation within the cloud rarely seems to be a key criteria for making decisions about the cloud but is one area where an IT Department can make significant savings in a short time frame.

Where Next for IT?

The IT Department is currently under a significant pressure in terms of having to change their modus operandi across the board to accommodate the plethora of new technologies and operating methodologies that are disrupting more traditional ways of thinking. In the midst of this pressure for change, automation is one area that could significantly benefit IT Operations but one that is often disregarded because it is still being evaluated within the confines of the 'old' IT Operating paradigm.

It could be argued that automation may gain more traction within IT Departments now had it not existed as an unfulfilled objective for the past few years. There is a difficult contradiction between the increasing need for automation in the new cloud based world and the increasing scepticism within IT about investing in solutions that haven't succeeded in the past. Perhaps the most effective solution to this is to learn from the development of automation in other parts of life as described within this White Paper and to treat IT automation as a business change and re-define the approach so that it is about people, process and accountability and essentially needs a human-centric approach for it to succeed.

Read more by Simon Ratcliffe, here

References

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