Adoption of Robotic Process Automation

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A Brief Introduction to RPA

While conventional methods of automation have been around for centuries, a relatively new form of automation that has become popular in the past couple years is Robotic Process Automation, often shortened to RPA. Businesses are making greater strides in attempting to find new ways to streamline productivity and increase efficiency, and one of the most popular ways of achieving this is through RPA. Because Robotic Process Automation is a relatively new term there is still quite a bit of discourse on its exact definition, but the idea behind all forms of RPA is to build automated systems on top of existing software or systems, in order to mimic typically human tasks done on said existing systems (Hoffman, 2019). RPA has the unique distinction of being a relatively novel concept with broad applications across both business and research. However, its novelty may also lead to possible misuse of the technology, as businesses and researchers rush to apply it without fully understanding RPA's potential.

In this paper I will investigate patterns in the success and failure of Robotic Process Automation adoption. To do this, I will apply the Social Construction of Technology (SCOT) framework as a way of understanding the link between human interaction with RPA and the pace of RPA's acceptance and adoption in real world applications.

Social Construction of Technology

The SCOT approach attempts to understand technology from a human understanding of the technology being investigated. Robotic Process Automation may be a fantastic approach to given task. However, according to the SCOT framework, the adoption of RPA to that approach deals less with RPA's aptitude, but rather the human and societal understanding of RPA (Bijker, 1995). It is society that defines a technology and thus motivates or hinders its adoption. As an emergent technology, RPA is in a very important developmental period in its lifecycle as a technological artifact. Its success and failures, or perceived success and failures will play a crucial role on how it will be defined in years to come. Understanding how these assumptions about a technology are made is crucial to understanding the technology itself.

The flexibility of RPA lends itself to being utilized in any number of different ways. As it stands, there are plenty of case studies on RPA across a wide variety of fields, including both traditional business like banking or accounting, as well as in more research based fields. It's for this reason I chose the SCOT framework to analyze RPA, as a diverse possibilities of applications of the technology will in turn create a diverse understanding of the technology across many studies. In this paper I hope to cast a wide net in capturing many unique viewpoints on RPA as it adheres to separate. Additionally, Klien (2002) points out that the frame which we view a technology using the SCOT framework extends much further than selected case studies as well, such as the goals or main problems of those involved in the technology's adoption. It is important to understand the stakeholders of all those involved with a technology in order to get a more whole perception of RPA.

A Better Understanding of RPA

One of the most visible ways digital automation has helped us is through robotics. Robotics combines aspects of both classic and digital automation by automating tasks that use manual labor while using software to dictate the robots' actions. Automation through robots is one of the most well known forms of automation due to a robot's physical presence, but there has been an increasing shift toward robotics as a purely digital form of automation. This is the idea behind Robotic Process Automation, or RPA. RPA is the idea of allowing robots to control other computerized systems, similar to how a human would control it (Asquith et al., 2019). The concept behind making a computer use a computer can seem redundant, but it has far reaching applications and benefits. Robotic Process Automation is quickly becoming an essential tool to accelerate production in increasingly competitive markets (Madakam et al., 2019). Already RPA is being adapted to a growing list of automated processes, such as caregiving, driving, and surgery. Regardless of which field RPA is being applied to, the driving force behind its innovation is the creativity of the stakeholders, that is, those who apply it to their work.

Conceptualizing RPA is difficult, as it cannot be narrowed down to a single technology. RPA is a concept that has been refined over the last few years by many organizations and individual minds. The automation that can be preformed by RPA not only has utility in a broad range of disciplines, but in the type and difficulty of the task at hand. Whether its clicking a single button or making complicated decisions on large data, RPA has solutions that fit all task sizes. The efficiency that RPA produces scales with the level of job it is assigned, which is why so many business and researchers have used it for their needs (Ribeiro, 2021). Another one of RPA's best features is its flexibility to allow for it to be paired with other appropriate technologies. RPA works especially well when it is combined with other automation tools, most notable of which is artificial intelligence.

Artificial Intelligence's Role in RPA

The automation we have now is equal parts complex and beneficial. Artificial intelligence is one of the biggest of such developments in modern automation. Advancements in AI allow for more than just menial tasks to be completed through automation, as applications can now think like humans. They can make art like humans, recognize faces like humans, and they can predict human behavior like humans. In most cases, they can do these actions both faster and more accurately than humans can as well.

Early adopters of RPA quickly realized the potential of artificial intelligence's ability to be adapted into Robotic Process Automation in order to create more elaborate solutions. AI has played a crucial role in allowing RPA to be expanded to more complicated jobs, jobs typically thought to only have been able to be done by humans (Ribiero, 2021). While using artificial intelligence in tandem with RPA opens doors to broadened applications for RPA, the pitfalls that have plagued AI come with. Issues surrounding AI have been well documented – if training data fed to an AI is insufficient, or is unrepresentative of the data the AI is meant to learn about, the AI has a high chance of failure (Borenstein, 2020). Another shortcoming that has challenged those wishing to pair AI and RPA is that of gauging complexity. Tasks that can be done without any machine learning are needlessly overengineered to include it, creating a process that is in best cases are overly complex and time consuming, and at worst dysfunctional. Artificial Intelligence and RPA can in theory, if done correctly, harmonize brilliantly with each other to create beautiful, highly efficient applications that free human resources for more important responsibilities. However, if the problem is not fully understood, than the solution produced through RPA will not use RPA to its full effect. These are important distinctions to make when investigating cases of RPA to get the complete picture.

An Auspicious Beginning

Robotic Process Automation has already contributed to several success stories, especially in the business sector where it has become increasingly popular to boost productivity and efficiency by freeing human resources in jobs that can be automated through RPA. A case study at the UK based company Xchanging by Willcocks et. al. (2015) showed an overwhelming success done by the automation team, even through doubts held by the team due to RPA's low visibility and lack of recognition at the time. A combination of an IT and marketing team was able to automate many low complexity but high volume business processing tasks to rapidly free up time for the overwhelmed employees at Xchanging.

Another case study by the same team done around the same time at Telefónica O2, a UK based telecommunication company, saw similar success. A massive back office rework was done to keep company costs low, redesigning over 60 process to be automated through RPA. This resulted in a seamless transition to a low cost automation process for most process within the company, allowing it to continue to increase its growing demand in providing cell phone services.

Both of these studies are notable for their early adoption of the RPA technology. As previously mentioned, these studies were published in 2015, and both actually started in 2013, when the concept of RPA was in its infancy. Both companies were hesitant to the adoption of such a new and untested technology, but eventually caved to pressures or outright desperation from unprecedented increased demand for their services. Another important note to make is that both companies opted to focus on automating low complexity, high volume tasks first. These represented low risk ventures into RPA, since it required a relatively small amount of skill to automate these tasks over others, and thus would be more likely to be successful. Neither report has any mention of any machine learning implementations while applying RPA to their needs, in fact most cases of RPA in both company were done on low complexity tasks. This means RPA was limited in what it could accomplish, but it was likely more complex implementations were simply unnecessary for what each company required to be automated. RPA implementations with low skill ceilings, combined with good communication channels between IT and the business personal on what the requirements for the RPA project were, resulted in each company achieving their desired productivity.

Continued Success, New Problems

Success stories like the ones at Xchanging and Telefónica O2 catapulted RPA's popularity. Around the turn of the most recent decade search queries for RPA had increased more than tenfold, along with a trend to increase into the 2020s (Jovanovic, 2018). Business scrambled to look for ways to apply RPA for their own work, with a focus on utilizing RPA for repetitive, low complexity tasks. Often, companies outsourced the job of creating RPA implementations to companies such as UIPath and Blue Prism. These companies specifically advertised their ability to find uses for RPA in their client's work. Around this time the definition for RPA began to expand in the same way it popularity did. Using machine learning elements in tandem with RPA began to gain ground as a way to be able to automate more complex, typically human held jobs. Around this time as well researchers also experimented with RPA as well to aid them in lab based experimentation (Agostinelli, 2020).

Early adopters adopters of RPA often questioned its utility, whether putting in the time to automate a given processes was worth the effort. Most of these doubts were quelled in RPAs rapid rise in popularity, but the technology's meteoric rise brought new issues to light. Because RPA is such a lightweight technology, there is no one-size-fits-all solution a handful of automation tasks. Each task must be carefully analyzed followed by the formulation of an appropriate RPA approach to the task before a solution can be created. This can prove troublesome from individuals or organization that pride themselves on conformity or quick answers, leading to cookie-cutter RPA implementations that are doomed to fail. Another issue centered around the name RPA itself. The commerciality of RPA began to take its toll, and the technology started to become a buzzword. Though the term ‘Robotic Process Automation’ was said regularly among business circles, the reality might be fewer people actually understood what it meant (Herm, 2022). If RPA was not properly understood by the people singing its praises, how could it be used profitably?

In 2020 Garter Inc. declared that RPA entered “the trough of disillusionment” stage in its lifecycle (van der Mueren, 2020). A growing minority began to believe that the hype around RPA resulted in its name being repeated ad nauseum. Studies showed that these doubters weren’t just being contrarians. A report from Huang (2020) estimated that as many as 50% RPA projects in businesses would fail. This is a staggeringly large percent, and represents an uncountable number of lost hours and resources. For many, RPA had become a time dump, the very thing it was designed to eradicate. Some attributed these failures to the lack of a proper framework (Herm, 2020). Designing RPA applications had no rulebook because of how much it differed from job to job. The lightweight property that had allowed RPA to become as successful as it was might also be its downfall. Whether or not to include artificial intelligence as a feature in an RPA project, or to what extent, is an additional piece to the puzzle. Projects can become backlogged or buggy if AI is implemented improperly, creating additional time sinks for the automation task. Creating a framework that worked for all RPA projects would be an incredibly difficult task, but that didn’t stop many people from trying. In light of this issue there are now many papers that make attempts to create a unified RPA framework to avoid wasting time on failed projects. The utility (and popularity) of these frameworks are unclear, since they are all so new, but they provide a stepping stone for future work on a universal RPA design process. The effect these frameworks have on RPA itself is also unclear for the same reason, though it will be interesting to see how they will play out in the years to come.

A Potential Labor Crisis?

The 2015 case studies at Xchanging and Telefónica O2 briefly mentioned a question that was posed by employees of each company, will RPA take our jobs? The answer in the study was simply no, RPA focuses on automating low complexity jobs that allow for human resources to be used on more important tasks. This may have been true in these isolated cases, but RPA and the jobs being done by RPA have changed drastically since 2015. The advent of artificial intelligence has allowed jobs that were previously thought to be non-automatable to be automated. Automation through RPA may pose a serious threat to many white collar jobs.

Automation has been making unskilled labor obsolete for centuries, and is usually the drive of innovation. As more unskilled positions become obsolete due to automation, it opens up more positions for more skilled labor, which in turn drives up wages (Smith, 2018). The higher wages create a higher standard of living for laborers and their new skills. This has been happening for years, so why is there such a stigma around automation taking jobs? The answer may not be as cut and dry as it seems. The unskilled workforce has been expanding, not shrinking (Autor, 2016). This includes white collar jobs such as data entry, processing, or other relatively unskilled office positions. Unskilled labor isn't going away anytime soon, meaning the people automation affects isn't just large, it's growing. Saying that automation creates more skilled positions is easy, but can it keep up with the pace at which it displaces less skilled positions? If automation eliminates more jobs than it creates, large numbers of job vacancies created by increased automation using software can be disastrous, compounded further by a growing unskilled labor market (Chen, 2021).

A growing trend in labor markets in modernized societies is a shift toward independent work. More and more workers are choosing to do labor on-demand, as personal entrepreneurs.

This development has evolved independently of the rise of digital automation, but is nonetheless affected by it. Increasingly, the labor done by these individual workers is being made obsolete by digital automation like RPA, and little has been done to provide safety nets for those affected by this transition (Gruber-Risak, 2022). Individual workers are particularly susceptible to instability created from automation phasing out their line of work, due to how recent and unprecedented the trend of independent work is. Governments have been unable to account for the growing number of on-demand laborers in the ever-changing labor market. Sick leave and pensions are examples of protections that these workers do not have access to across the entire world, even in almost all developed nations. As individual work increases, instability created by their displacement will increase as well unless governments create policies to account for those impacted by adopting digital automation. Governments shouldn't feel the need to counteract the move toward individual work either, as it provides increased flexibility for labor to be completed and frees up intellectual capital to be used elsewhere if it is outpaced (Sundararajan, 2017). It is the role of lawmakers to reshape institutions to allow individual workers to thrive, even if the labor they currently provide is replaced with machines. Options like universal basic income can become integral in allowing labor to evolve and digital automation to continue to innovate without having to disrupt job markets.

The reality is that governments should not feel the need to shy away from adopting digital solutions. If handled properly, automation does not remove jobs, it transforms them. A key feature in making automation work is ensuring that capital and resources are evenly spread throughout the population (Lawrence, 2017). The main reason those who lose jobs to automation find themselves in economic trouble so often is that the labor that they provide is usually less skilled, which usually results in lower wages. Reducing economic inequality facilitates those who lose their ability to provide labor to invest in learning more skills that they can then use to find work. As it currently stands, the overwhelming flow of capital is directed toward those who own the automation, and who are generally unsympathetic to those who they displace. Without economic inequality, those who are replaced by automated labor fail to find new work and do not have the capital to find new skills. This creates both a larger wage gap and a larger skill gap. These two issues compound each other, and only lead to further economic and political strife (Spencer et al., 2021). Ultimately, if businesses cannot be sympathetic to their workforce (or simply cannot provide aid to them, in the case of independent workers) then it falls on the role of governments to create and regulate social programs that make it so economic inequality is minimized.

The Reputation of RPA

Despite all the controversies that have plagued RPA in the past couple years, the overall effect on the adoption of the technology seems to be negligible. Companies and researchers continue to find new, creative implementations for RPA that raise profits, keep their workplace agile, and increase productivity. Possibility of production lost to failed RPA projects created discourse about the feasibility and latent downsides of RPA, but ultimately did little to stop its rising popularity. Threats to jobs lost to automation done by RPA do little to deter its adoption, regardless of the consequences it has on a potential labor crisis. RPA is more popular than it has ever been, though it can be said that the increase in its search popularity is tapering off. Even with all the problems RPA faces, it is easy to see why it is still trending. Case studies continue to document success stories of companies that properly integrate RPA into their companies, and people continue to regard RPA as the next big step in automation. Through the SCOT framework it is clear why RPA adoption is increasing, society's understanding of the RPA technology is surrounded by a mist of innovation, productivity, and progress. RPA's reputation proceeds it, many calling it a 'revolution' in the work space. The disparity between documented cases of failure and documented cases of success of RPA in business is quite large, and until more failures through RPA are reported, RPA's reputation will continue to increase its rate of adoption in practice. As businesses continue to put RPA to good use it doesn't seem likely for RPA to fall out of fashion, even if not every RPA project succeeds.

Conclusion

Cases show that RPA can be highly successful in increasing productivity in almost any environment. Even with dissent sown from those who worry of issues caused from RPA being too flexible or eliminating too many jobs, RPA continues to grow as a concept, as well the number and complexity of its real world implementations. RPA will continue to do so as long as its reputation continues to advertise it as the cornerstone of the modern workplace. It will be interesting to see how the framework of the RPA design process changes to reflect the needs of its stakeholders in the future.

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