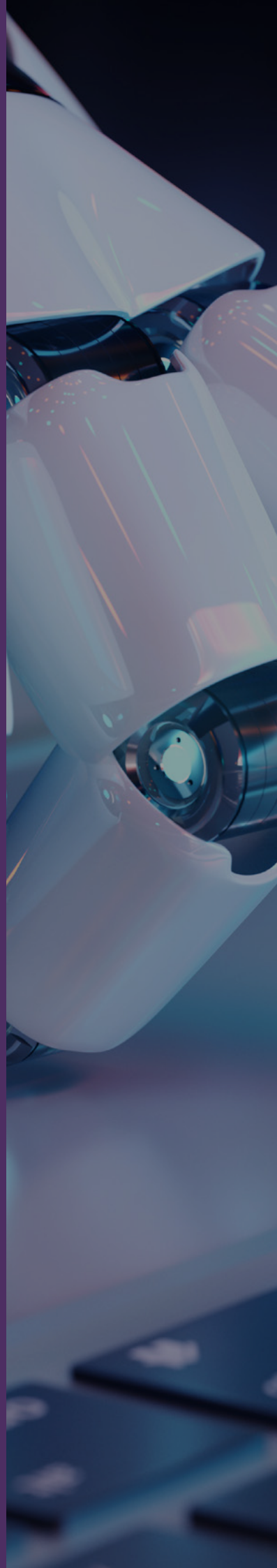




# Cognitive Automation – Convergence of AI and RPA in Banks

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# 01 Introduction

Digitize or die – is the prevalent slogan, especially in the financial services industry. With the increasing importance of digital in our world, driven by digital-savvy customers, it has become a strategic priority for financial institutions. Whether it is combating the customer experience of Netflix or process efficiency of a nimble fintech, the financial services industry is in a state of flux. However, unlike its clichéd image of a slow-moving monolith, the financial services industry has been active and leveraging new age technologies to take on all challenges.

One of the technologies that has had a significant impact on this industry is Robotic Process Automation (RPA). This technology, which essentially deploys software robots to automate repetitive, rule-based, and high-volume tasks, has helped financial institutions achieve their digital transformation goals. The popularity of this technology can be attributed to its non-intrusive nature, scalability, and full-time support.

RPA as a technology has found lot of users in the banking industry primarily due to its quick ROI and significant cost saving it delivers. An industry survey suggests that RPA can bring in 30% - 60% of cost saving through quicker turnaround, increased efficiency, lowering error rates, and FTE reduction. One such example is a German bank which deployed RPA in its account opening process to completely automate the process, reducing its costs by 70%.

Unsurprisingly, the RPA software and services market is expected to grow to \$4.3 billion by 2022 from its current size of \$1.7 billion, according to HFS Research.

However, like any other technology, RPA is continually evolving to meet the needs of the financial services industry. RPA technology is now augmenting itself with the potential of Artificial Intelligence technology, giving rise to what is known as Cognitive Automation.

# Cognitive Automation

**RPA software and  
service market expected  
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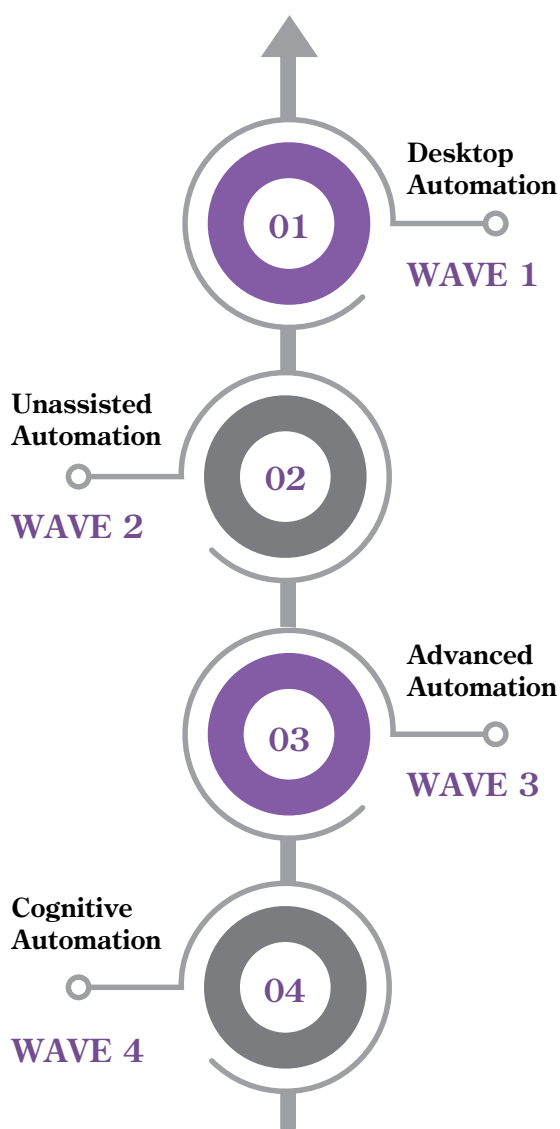
**2022 – HFS Research**

So, what does Cognitive Automation bring to the table that augments the capability of rule-based RPA. Cognitive automation is the combination of Artificial Intelligence technologies and Robotic Process Automation to elevate the benefits that can be derived from only rule-based RPA. Cognitive automation leverages allied technologies such as speech recognition, natural language processing, machine learning, computer vision and so on, in order to bring in human-like capabilities such as judgement, continuous improvement and decision making to automate processes. Thus cognitive automation increases the number of process, including complex ones, that can be automated.

For instance, cognitive automation enables processing of data sourced from non-standard documents such as salary slips, payment transaction records, financial reports, employer statements as well as unstructured data such as images, video & audio files, text content and so on. Usually, banks would deploy human workers as these documents require judgement for selecting the right data which a rule-based RPA would not be able to process. However, with the use of Cognitive Automation, processing this data is possible, thus significantly increasing the number of processes that can be end-to-end automated.

Another enhancement in cognitive automation compared to rule-based RPA is the continuous learning made possible by technologies such as machine learning or deep learning. These technologies allow the bots to “self - learn” and improve the processes and make the workflows more efficient.

# Evolution of RPA into Cognitive Automation



Robotic Process Automation as a technology has been quickly evolving as all the participants leverage new technologies such as artificial intelligence, machine learning, deep learning, natural language processing, etc. to influence the growth path of RPA. While the technology is evolving, banks are at different stages of their implementation lifecycle hence making it imperative for them to understand their maturity level and see where their needs fit into the evolution of RPA.

## Wave 1

This was the first iteration of RPA, where automation tools were used to assist human operators in conducting their jobs. Typically deployed on work machines, these were supervised by human operators to do repetitive tasks such as documentation completion wizards.

These systems have limited automation capabilities and scalability but have proved to be useful to improve productivity by cutting down on time required to complete repetitive and more straightforward processes. Since these tools sit on the work machines, they can merge into existing processes; however, scaling these tools has proved to be a challenge.



## Wave 2

This is the next iteration of RPA, where automation tools evolved to be able to complete standardised processes unattended by human supervisors. The tools are typically hosted on a central location allowing greater scalability, instead of individual workstations.

This phase of RPA allows complete end-to-end automation in the running of tools. These do not require manual triggering of actions for processes to begin or to shut down on completion of the operation. The steps can be automated, and multiple deployed tools can be supervised through dashboards to assign tasks, prioritize processes, and intervene for the tool's performance whenever required.

This kind of automation allows processes to run virtually throughout the day, with minimal supervision allowing a high level of efficiency in the processes. Nonetheless, Banks need to be aware that this kind of automation is beneficial where process are standardised with minimal exceptions, and digital data is readily available.

## Wave 3

This is an advanced version of RPA where it can autonomously complete more advanced processes without human intervention or supervision. Commonly deployed through the cloud, it allows dynamic scaling and automatic load balancing. It has the capability of enriching the underlying structured data using advanced analytics, allowing the tool to make prescriptive suggestions to deal with exceptions.

For banks to take optimum advantage of advanced automation, there will be a need to redesign workflows and processes. Banks will need to identify and document all the siloed processes and ideally restructure those or make them an exception.

## Wave 4

This is expected to be next state of evolution of RPA where it is augmented by Artificial Intelligence and related technologies such as machine learning, data mining, natural language processing, etc. This would allow financial institutions to take advantage of both structured and unstructured data.

Cognitive automation would result in a state where all the decision-making processes are handled by the automation tools, allowing complex tasks to be automated. This would then have the potential to augment or replace the human element from business processes, bringing down errors and significantly increasing the productivity of the institution. However for cognitive automation to be successful, banks have to ensure to create an efficient feedback loop to continuously improve the self learning required for artificial intelligence.

While financial institutions have embarked on the road to automation, experimenting with or deploying at least the wave 1 phase of RPA, there is a widespread ambition to move quickly up the RPA value chain. The more advanced banks are at the wave 3 stage, deploying advanced RPA solutions. Cognitive RPA is the next logical step for most of the institutions with leading suppliers already offering these solutions to banks for actual production deployment in a few niche areas. However, the rapid advancement in these technologies suggests that it is not a steep step for institutions to take.

However, the success of Cognitive Automation is dependent on the maturity scale of its underlying technologies. Artificial Intelligence technologies such as NLP, ML are at different points on the maturity curve. All these technologies need to be at a similar level of maturity for it to derive maximum benefit for cognitive automation.

The benefits that financial institutions can derive from cognitive automation are obvious. Some of the areas where cognitive automation can have an influence are explained in the next section.

A woman with long brown hair and black-rimmed glasses is shown in profile, looking down at a laptop. She is wearing a light blue and white patterned sweater. The background is dark and out of focus, with a small green plant visible on the left. The overall lighting is warm and focused on the woman.

# 04 Potential Benefits of Cognitive Automation

Cognitive automation has the ability to significantly transforming the processes of a financial institution, and this is reflected in the thinking of the executives. An industry survey indicated that the executives are very keen on automation, and 95% of them have claimed to have embarked on or planning an automation strategy. While the benefits of cognitive automation are undeniable, there are a few areas where cognitive automation would have a bigger impact compared to others. Some of the areas within financial services where cognitive automation would have a significant impact are:



## Customer Experience

Customer satisfaction has become a critical focus area for all the key executives of financial institutions having realized that their offering has become a commodity thus leaving this as the biggest source of differentiator for them. Use of cognitive technology such as AI and ML chatbots, voice authentication technology, natural language processing in combination with automation can significantly improve customer satisfaction through real time query resolution, easier onboarding, quicker decisioning etc.

### Use Case:

**China Merchant Bank**, a leading credit card issuer in China. The bank's front-end bot powered by WeChat messenger handles as much as nearly 2 million customer inquiries on daily basis. Since most queries are quite common, automated responses via AI powered chatbot proves to be a cost-effective solution and improves customer satisfaction.

### Use Case:

**BNY Mellon** has leveraged more than 220 RPA bots integrated with Artificial Intelligence for process efficiency and cost saving in processes such as external data requests, fund transfer etc. The outcome of this initiative is 100% accuracy in account closure across five systems, 88% improvement in processing time, 66% improvement in trade entry processes and significant reduction in reconciliation of failed trade 0.25 seconds vs 5 –10 minutes earlier.

## Cost Efficiency

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## Digitization

Digital transformation is a key initiative for all organisation and financial services industry is no different. As more and more financial institutions embark on their digitalization journey, cognitive automation can be the lead driver for these initiatives. Whether its converting unstructured data such as audio files of customers calls using NLP or trade finance documents using computer vision into coherent data to processing such data without human intervention, automation fuelled by cognitive technologies will be in the forefront of increasing digitalization across financial institutions. A direct implication is the end-to-end automation of loan processing, where loan decisioning can be done by machine learning and predictive analytics as the technologies can conduct credit check based on structured and unstructured data sources to arrive at a better credit decision.

### Use Case:

**KBC Bank** processes more than 90,000 invoices with approximately 15,000 potential users who are operational within these processes. Optical Character Recognition (OCR) was leveraged to automatically capture some fields on the invoice such as the amount, supplier, PO number and invoice date.

## Data streamlining

Digital data is the fuel that will power the digital transformation of an organisation, thus having data integrity is of utmost importance. Use of automation for tasks such as data entry has the potential to significantly reduce data entry errors leading to improved data quality. The use of cognitive technologies such as OCR, computer vision allows processing of both structured and unstructured data potentially providing the opportunity to use previously inaccessible data, thus contributing significantly enriched data for organisations to leverage.

## Audit & Regulatory Reporting

A key benefit derived from deploying cognitive automation is that these bots meticulously keep records of all the transaction that they process. While errors can creep into a record-keeping activity of a Human operator, there aren't any such issues in case of a bot. Thus, this easily retrievable data in a structured format can be used for auditing purposes and regulatory reporting. These technologies can be deployed for the automation of the entire regulatory reporting process.

## Data Analytics

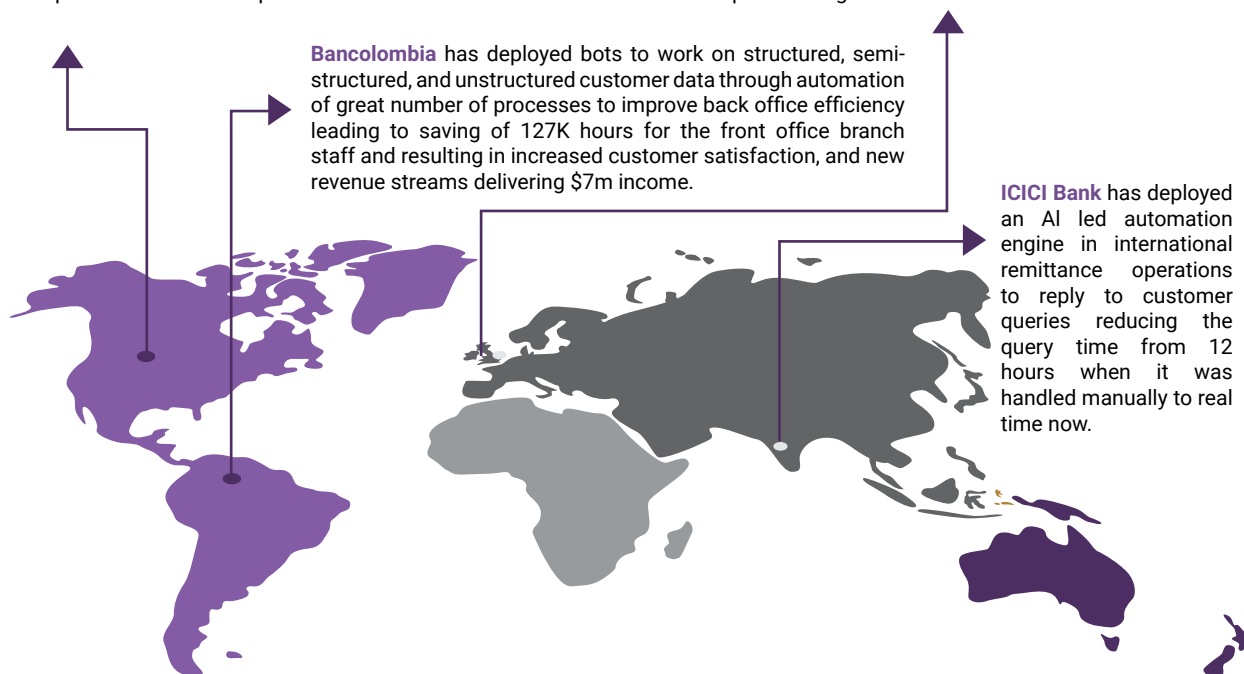
The use of automation leads to the generation of lots of digital data across the entire process. The use of artificial intelligence or predictive analytics to work on top of this huge pile of data can have significant benefits for an organisation. It can be used for customized offerings for the end customer leading to increased cross sell / up-sell opportunities. Cognitive technologies such as machine learning, through the use of predictive analytics, can be used to detect fraud in real time, allowing organisations to prevent or mitigate fraudulent activities. Since ML allows the system to "learn", it can also detect new patterns of fraud, helping prevent new types of frauds.

**Vanguard Group** has launched a AI powered robo-advisor PAS to work along side human advisors. The roboadvisor creates and executes the investment plan with human advisor acting as a supervisor to the whole process.

**Barclays Bank** has implemented automation across functions such as fraud detection, risk monitoring, account receivables processing and loan application leading to a total of £175 million annually in bad debt provisioning.

**Bancolombia** has deployed bots to work on structured, semi-structured, and unstructured customer data through automation of great number of processes to improve back office efficiency leading to saving of 127K hours for the front office branch staff and resulting in increased customer satisfaction, and new revenue streams delivering \$7m income.

**ICICI Bank** has deployed an AI led automation engine in international remittance operations to reply to customer queries reducing the query time from 12 hours when it was handled manually to real time now.



### Actual use of Automation by Financial Institutions from Around the World:

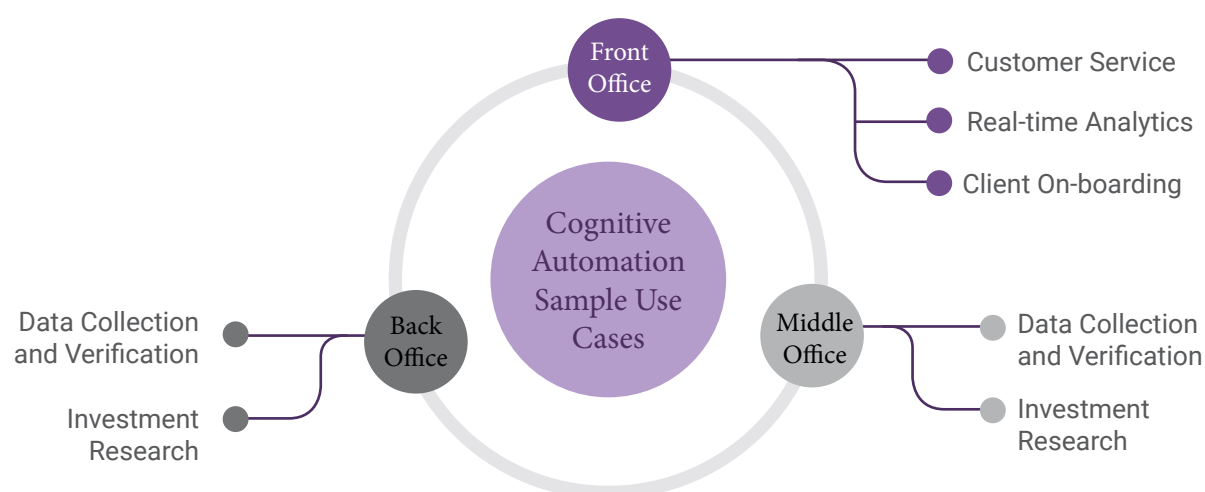
#### Front Office use cases:

- » Customer Service: AI and NLP powered chatbots can be deployed by banks to answer queries where judgement is required, assist with product search and requests to improve customer retention.
- » Real-time Analytics: Banks can leverage text mining and data modeling to extract real-time insights from chat reports to offer customized offers to increase customer satisfaction.
- » Client Onboarding: Client onboarding is a particular pain point for banks which can be made simpler and quicker using cognitive automation by collating required information about the client from the varied sources and in different forms reducing the time required for on-boarding.



## Middle Office use cases:

- » Data Collection & Verification: Cognitive technologies such as OCR, machine learning, computer vision can be used to collate data into a standardized format from varied unstructured data sources, which can then be used for verification and assist human decision making.
- » Investment Research: An emerging use case is the use of cognitive automation to assist and potentially replace human advisors by conducting investment research through deciphering various financial documents, incorporating macro factors into the models and so on.



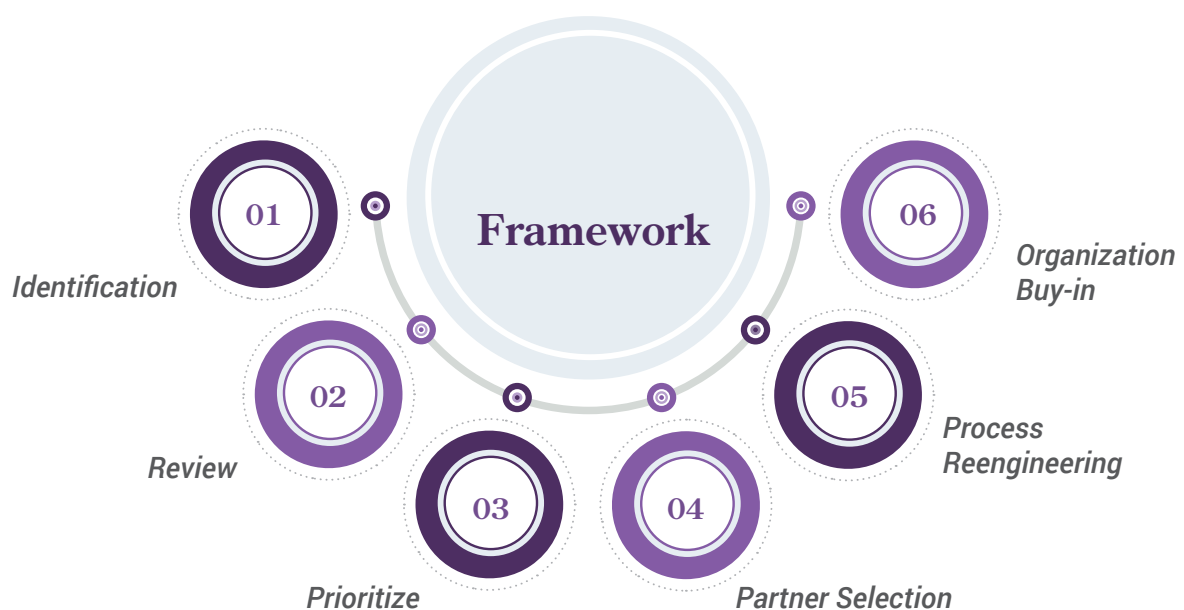
## Back Office use cases:

- » Account Closure Process: Automation can be used in the back-end to transact on voluminous client request such as account closure which requires some judgement based decisions such as closing the account if the customer has provided incorrect proof, or not operated the account for a set period of time and so on.

While the benefits of cognitive automation are multiple, these benefits can only be optimised if the financial institution follows a right strategy. The next section provides a framework that financial institutions can follow for their cognitive automation strategy.

# 05 Framework for Cognitive Automation Implementation

As clearly illustrated so far, cognitive automation has the potential to automate processes that were out of the realm of rule-based RPA. The underlying elements of cognitive automation such as artificial intelligence, machine learning, natural language processing, etc. allows financial institutions to look at processes that might require some judgement to complete the processes. Thus, the addition of cognitive technologies elevates the impact of RPA, implying financial institutions will need to have a framework in place to take maximum advantage of these technologies. We have suggested a six-step framework that can be leveraged by banks for bringing in cognitive automation into processes.



## Step 1: Identification

The use of cognitive automation allows banks to significantly increase the type of processes that can be automated by leverage both RPA and cognitive technologies. It is imperative to identify use cases that will yield maximum benefit from the use of automation and cognitive technologies in tandem. The use cases identified should be based on the following parameters in order to extract maximum value:

**Cost and Revenue impact:** The most important processes are those that have a direct impact on both the cost of operations and revenues derived from the successful automated execution of those processes.

**Volume:** Automation allows institutions to reduce human efforts in repetitive work, thus processes with high volume of repetitive work requiring programmable judgement would be an ideal candidate for RPA or Cognitive RPA.

**Irregular demand:** Processes which have intermittent or seasonal demand such as high volume of credit card transactions during holiday season requiring additional workforce bring in a lot of inefficiencies if these are to be addressed by human workers. Since the load on an automated process can be varied easily, these processes are good candidates for automation.

**Error-prone:** Many of the client facing processes or regulatory processes might be prone to human error due to the quick turnaround needs of these processes. Thus, these processes which have low fault tolerance but need to be completed on time can be automated. Cognitive technologies such as advanced analytics and machine learning can be leveraged to ensure accuracy of the data.

**Data quality:** A major consideration for automation is the input data quality. If the data is structured, then it can be automated with lesser effort. Processes with non-standardised and undefined unstructured data would be an ideal candidate for automation using cognitive technologies.

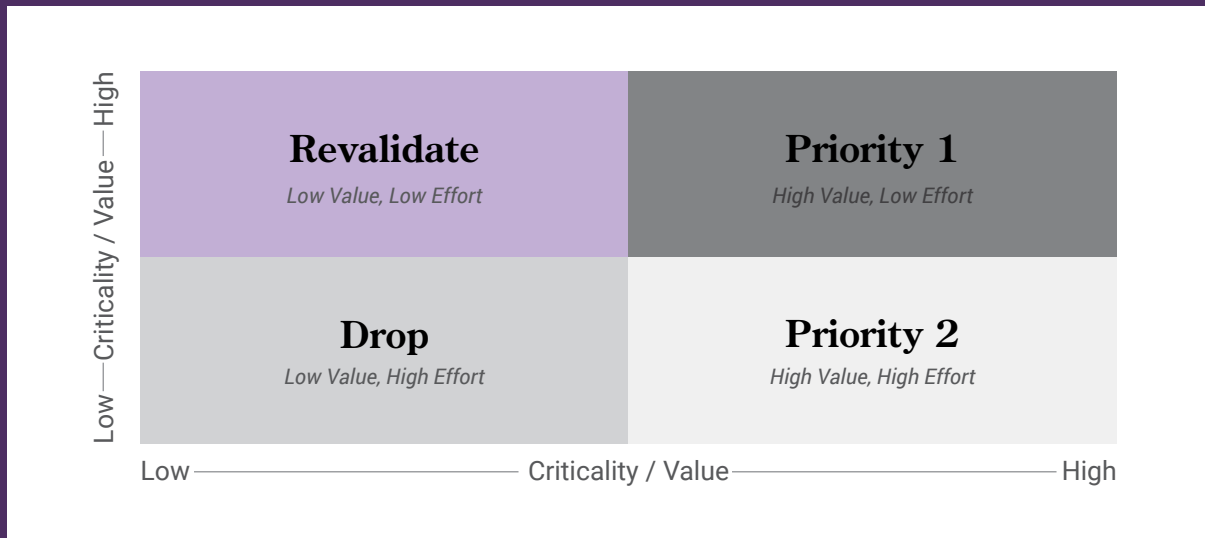
## Step 2: Review

Once the processes have been identified, the next step involves reviewing the use cases and selecting those processes that can be automated and derive maximum benefit using cognitive automation. It is crucial to verify the current state of automation across these processes and examine these processes with key stakeholders from the business end of the bank to understand the expected outcome.

Usually, processes that can be defined with set rules are the easiest to automate. Bots need to be programmed to perform a particular process and hence processes, where there are a lot of undocumented exceptions, would require significant effort and would not make an ideal candidate for automation. It is in these scenarios where the impact cognitive automation needs to be assessed. Cognitive automation utilising artificial intelligence, machine learning, and other related technologies can be trained for processes which require judgements or decisions; however it is imperative to verify the output as AI can incorrectly identify rules which would lead to errors.

Another key consideration is the maturity of the processes. It would not be feasible to use cognitive technologies in processes that would eventually change prompting reprogramming and rework. Thus, it is critical to select those processes that are stable and let humans deal with non-standard processes.





## Step 3: Prioritize

Once the processes have been identified and reviewed, a shortlist must be created. An in-depth study of the business impact and effort required for the implementation must be done. Based on the outcome of the above exercise, processes must be mapped in the business impact vs. effort matrix.

All the processes that fall in the Priority 1 bucket must be automated at the earliest. These will have maximum impact on the organisation.

Processes that fall in the Priority 2 list must be further evaluated for their impact on the overall organisation. Priority must be given to those processes that have the potential to have a significant business impact in the future.

Use cases that fall in the revalidate bucket must be reviewed again to assess the importance of automating these processes. Some of these processes can be dropped.

All the processes that fall in the drop bucket would generate minimal impact for the investment, hence must be dropped from the shortlist.

## Step 4: Select the correct partner for cognitive automation

An important element of getting the maximum value out of the automation effort is to select the correct partner for the project. Automation technology has become a commodity in today's time and there are a plethora of automation vendors available in the market with similar products. Thus it is imperative that organisations keep cognitive technology expertise in mind while selecting the right partner. Organisations should consider the following parameters when evaluating the solution provider:

**Automation Libraries:** Suppliers with pre-built libraries and pre-configured tools with support for cognitive technologies for processes provide significant time and cost savings. These solutions can be easily integrated into the back office and other support systems, while being future ready for enhanced automation leveraging artificial intelligence

**2. Implementation Support:** Benefits of cognitive automation can only be achieved if the tools and bots used are implemented to extract the maximum value. Thus, selecting a supplier that provides end-to-end process support is critical.

**3. Type of automation Bot:** Typically, suppliers offer both programmable bot or code free bots. Based on the complexity and programming needs of identified processes to be automated, supplier providing the relevant bot must be selected. For example, in very complex processes, programmable bots with machine learning capabilities are preferable while in simple, standardized processes code-free bots that do not require technical skills are better.

**4. Future Roadmap:** Rule-based automation has become a commodity and the next level of differentiation from automation will come from marrying cognitive technologies with existing automation. Thus, suppliers who have a clear roadmap of integrating these newer technologies into the current stack of products would be apt to select.



## Step 5: Process Re-engineering

Processes in most of the financial institutions were designed to make the most of the human workforce available. The efficiencies in-built into the processes were as a result of making the human practitioner efficient. However, these same processes might not be as beneficial for automation. Normally, it leads to organisations automating standalone processes, without consideration of where the process would fit in the larger scheme of things.

To derive the maximum benefit from the available cognitive automation technology, re-engineering of the processes to make them efficient for automation is a must. These would include breaking down processes and redesigning them to make them rule-based, removing exceptions, and have fewer interdependencies. In complex processes where the workflow cannot be simplified, they should be designed to derive optimal advantage of cognitive technologies such as Artificial Intelligence, machine learning, etc. In either case, organisations should have a platform based approach to automation with organisation-wide view of processes instead of a restricted individual process view.

This would also nicely align with the digital transformation initiatives of an organisation, which would lead to more opportunities of automation creating thus a self-fulfilling circle.

## Step 6: Organisation buy-in

**Wells Fargo has  
establishment  
an Artificial  
Intelligence  
Enterprise  
Solutions  
team within  
the Payments,  
Virtual Solutions  
and Innovation  
group to focus  
on accelerating  
opportunities  
with artificial  
intelligence.**

Cognitive automation will have maximum impact when it is deployed at an enterprise level. Thus its' influence would be felt in the whole organisation, making it imperative to get a buy-in from the entire organisation. Right from the management, and the teams who will be affected by the automation as it would result in a realignment of their roles to the IT who would be deploying and maintaining the bots and related technologies, it does affect the entire organisation.

One recommended way of going about this is to identify process champions across departments and make them a part of a cognitive automation centre of excellence. This has the potential to significantly improve decision making while ensuring all relevant stakeholders are on board. A quick way to showcase automation success and expedite organisation buy-in is to start small and achieve quick wins.

Once the cognitive automation process has started, it is vital to ensure coordination between all the relevant departments of the organisation. This includes business process owners working closely with IT functions and the data analytics function to achieve maximum benefit.

It is also essential to ensure that cognitive automation is seen as a continuous, evolving process rather than a one-time effort. This would ensure that the organisation would be able to benefit from emerging technologies such as machine learning, chatbots, NLP, computer vision etc and meet the changing requirements driven by customer and regulatory needs.



# 06 Outlook for Cognitive Automation

Cognitive Automation is an omnipresent future for all financial institutions is an undeniable fact. The benefits derived from both rule-based RPA and cognitive automation and their direct impact on the bottomline of these institution means that there will be continuous investment and development of these technologies.

The leaders in implementing automation technology would typically be the tier 1 and a few tier 2 banks who have the capacity to work with leading vendors in partnership and also have resources dedicated to implementing the technology in line with their strategy. However, the smaller banks would be a laggard in using this technology as a result of the lower volume in their processes, the cost efficiency, and unmet ROI. Hence these banks would act as fast followers implementing proved technology for identified processes as the implementation cost drastically reduces.

As Cognitive automation evolves and becomes mature, it will have a significant impact on the financial institution's need for outsourcing. It would lead to financial institutions onshoring their back-end processes as the costs reduce and potentially remove the need for offshoring totally.

The merger of artificial intelligence and robotic process automation has started to have a significant influence in the financial services industry. All the processes with these organisations, right from

customer experience, fraud mitigation, digital transformation initiatives, loan processing, wealth advisory would be impacted by it. As some of the AI technologies such as machine learning, computer vision, natural language processing etc mature, cognitive automation can completely transform and revolutionise the financial services industry.

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**Rules-based automation is short lived; that's not where the value proposition is. It's in RPA plus cognitive computing plus advanced analytics plus work- force orchestration.**

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