Technology Dimensions of Automation in Business Process Management Industry

Sumit Mishra, Sree Devi K K, Badri Narayanan M K

Abstract: Internet revolution made it possible to export services beyond the nation's boundaries to leverage global workforce at low cost locations that revolutionized outsourcing as a strategic strategy to optimize cost. Business Process Management Industry has gone through various types of continual improvement approaches in last two decades of its growth to improve processes for efficiency. A continual improvement methodology does help an organization during its growth phase, but, during transformational times, one needs to rely on automation as a solution. This is the current situation with Business Process Management industry where customer facing businesses are digitizing customer facing operations to gain the competitive advantage of speed in the business services. Business Process Management Industry which supports these customer facing businesses also needs to automate the back-office processes in order to add value to the business. Robotics Process Automation is being deployed across at an exponential rate since "Speed" is of essence to remain competitive in today's challenging business times. While automation is being deployed across industry, one is seeing multiple instances of non-performance issues in deployment and technology causes of which is a grey area for investigation.Research methodology includes inputs from relevant literature and case studies from organizations who have experimented with automation and research conducted by industry think tanks. It carefully investigates technology aspects that impact automation initiatives from deployment perspective. Literature findings are further validated with empirical evidences through a likert 5 point scale survey taken by Project Managers and Users of automation. Survey is statistically validated and results are analysed to ascertain which are the most impactful causes that affect automation initiative. This research paper investigates technology related challenges of Robotics Process Automation deployment in the Business Process Management industry so that transition to digital business operation is seamless.

Keywords: Business Process Management, Digital transformation, Robotics Process Automation; Technology dimensions of Automation.

Mr. Sumit Mishra*, PhD Research Scholar, School of Management, Hindustan Institute of Technology & Science, Chennai, India.

Dr. Sree Devi K K, Assistant Professor, School of Management, Hindustan Institute of Technology & Science, Chennai, India.

Dr. Badri Narayanan M K, Professor, School of Management, Hindustan Institute of Technology & Science, Chennai, India.

I. INTRODUCTION

Organization across the globe have already benefitted by adopting outsourcing as a viable strategy to contain cost and add business value. But, today's businesses are changing rapidly in many aspects from the perspective of consumption based pricing model and customer's preference for digital service. In order to keep pace with these changes, organizations have to make their internal business processes digital as well. All this is not possible only with augmented human support and / or continual improvement methodologies. Hence, there is an urgent need of automation in the services sector. In addition to this, businesses across the globe have now reached a point where it requires a quantum leap in containing the cost due shrinking revenue and diminishing margins. The only silver lining that one can see now is through Digital operations.

A digital operation is now considered life blood of every business empowering how people work, buy, sell, connect and learn. A digital operation is a much broader term and, in fact, is a new strategy in itself for businesses to remain relevant in today's disruptive business environment. It encompasses leverage of technologies like Robotics Process Automation (RPA), Artificial intelligence (AI) and Cognitive etc. to power customer experience.

While RPA is mimicking human like inputs using Software Robots (BOTS), AI is more synonymous to thinking aspect of human brain. Cognitive is the next level technology in which a software robot can learn from experience, through human instructions as well as on its own by analyzing the patterns.

RPA is a set of technologies that enables the automation of routine and repeatable activities. In more technical terms, RPA is configurable program that is rule based and uses sequence of actions programmed to automatically complete processes with any number of different applications, exactly in the same way a human would perform such tasks, with exception management handling through human interventions.Automation, as a matter of fact, is not new for the BPM industry which has so far tried various tools like Screen Scrapers, Automated Workflows, Optical Character Recognition (OCR) / Intelligent Character Recognition (ICR) and use of Excel Macro and VB Scripts to automate business processes for over a decade but what looks new is the fact that experimentation to adopt RPA technology for automating end-to-end processes is at an unprecedented scale in current times. RPA is a powerful transformation tool that is set to revolutionize the BPM industry which has reached an inflection point in terms of further improvement in "Efficiency" and "Accuracy" for manual processes.Some of the key predictions on RPA growth by Industry think-tanks are as follows:

▪ As per HfS Research, RPA market will become $1.2 Billion by 2021; and
▪ As per Mckinsey Research, RPA will have an economic impact of $5.2 – 6.7 Trillion by 2025.

With this background of exponential growth, every BPM player is trying their best to maintain their competitive edge through adoption of RPA as the latest offering to their clients. In fact, few organizations have already included "Digital" in their service offerings to call out their seriousness about RPA adoption. For example: Cognizant Digital Operations, WIPRO Digital Operations & Platform and Accenture Digital etc.

It is expected that size of digital operations globally would grow much bigger as organizations are trying to implement RPA on end-to-end processes without the division of front room and back room from scope perspective. India as the largest outsourcing destination might face serious challenges to maintain and grow its market share in this exponential growth. It will no longer be the size of workforce that will matter anymore for the digital operations, but, what will really matter is the size of a techno-commercial workforce that can work seamlessly with digital workers to leverage its true potential. India has to position itself as the destination of first choice for digital Operations to maintain its current position as the leader.

In the initial stage of BPM growth, India has shown a sharp growth due its large pool of young workforce and low cost of wages but with the advent of digital workers, this distinct advantage would get challenged since a Software Robot (BOT) alias Digital Worker costs around USD 3000 per annum and that is what Industry also pays to a fresh graduate in India. In addition to that, organizations have to spend extra on infrastructure related costs per Full Time Employee (FTE) and other employee benefits making it much more costly than a digital worker. Employing a digital worker has a clear advantage from cost perspective since a digital worker would be able to work 24*7 for the whole year without any extra overhead cost. This digital worker does not have any location constraint as well and can operate from any location including the home location from where the outsourcing jobs initially moved to offshore locations. A digital worker once configured to a process would repeatedly process transactions without any accuracy defect and would be able to turnaround the transaction in the fastest possible time even for bulk line item transactions.

Digital transformation through RPA in the BPM industry is actually an evolving phenomenon and BPM organizations are experimenting with it using Software Robots (BOTS) from various product companies like Blue Prism, Automation Anywhere, UiPath and KRYON System etc.

There are four major components of any digital operations ecosystem: First, the organization that has outsourced its work to Global In-house Centre (GIC) or 3rd party outsourcing company; Second: GIC or 3rd Party Outsourcer that is providing outsourcing services; Third: Product Companies which are building BOTS technology and lastly, Partners of product companies who are entrusted with providing digital operation solutions acting as system and solution integrator.

As per Deloitte study conducted in June 2018, the top three priorities for organizations' automation strategies are to increase productivity, improve customer experience and scale up automation.

Most of the BPM organizations are currently deploying RPA to transform their business processes but the automation journey is not without many challenges. As per CEO of a large 3rd party BPM company, "the failure rate of adopting and implementing RPA is around 30-50% and this might well be a conservative estimate". In this research paper, we are making an attempt to understand Technology deployment Challenges that impacts automation of processes in the BPM Industry.

II. LITERATURE REVIEW

Digital transformation in the context of services is a new and evolving field of study and hence literature reviews have been done through various relevant resources of Industry leading research organizations. This has been enhanced further by inputs from National Association of Software and Services Companies (NASSCOM) conferences where main theme was around Digitization in BPM industry.

This literature review has provided the required understanding of challenges under investigation and based on that research objectives are framed with identified research gaps.

A. Ashwin Gadre , Ben Jessel and Karan Gulati in their article "Rethinking Robotics – Take a step back" in Henley Business School – Capco Institute paper series in Financial Services opined that robotics technology is not new and evolved from erstwhile small scripts, screen scrapers and automation workflow technologies that have been in existence for over a decade but the convergence of mature automation technologies and the need of businesses to get away from inefficiencies built in manual processes is the new paradigm. They have stressed that digitization success lies more in solving the business problem at hand that requires solution than the technology aspect which merely acts as a tool to solve the problem. Automation Technology is evolving to a more user friendly environment where configuring a process is through simple clicks, drag and drop of icons etc. This will remove dependency on coders for making changes whenever there are process updates impacting the process flow. Authors have also mentioned that there is more hype than reality around success of automation while their own experience has seen more of failures than success. **[10]**

B. David Edelman, Karel Dorner and Barr Seitz in their McKinsey article dated February 2016 with title "Achieving a digital state of mind" discussed that digital is not an add on tool but it is a way to look at broader needs like business models, customer journeys and organizational agility and then using tool and linkages in these to get things done. **[7]**

C. Matthias Daub and Anna Wiesinger in their Mckinsey article dated March 2015 with title "Acquiring the capabilities you need to go digital" discussed that for starting a successful digital journey, organizations need to think digital way of working with transformation across all parts of the organization and not in silos since organizations units and functions are tied closely through Enterprise Resource Planning (ERP) and other legacy systems. **[4]**

D. Tanguy Catalin, Johannes-Tobias Lorenz, Bob Sternfels and Paul Willmot in their Mckinsey article dated March 2017 "A roadmap for a digital transformation" have mentioned that cultural or behavioural change is the biggest challenge in pursuing digital strategies.

E. They opined that digital transformation has more to do with a rethought on business model than the digital technology itself. **[3]**

F. Stefan Biesdorf, Manuel Moller and Franziska Thomas in their Mckinsey article dated September 2018 "Barriers to Digital@Scale – Shifting the focus from tech to culture" found out through their survey that the challenge of digitization is no longer related to technological capability but more of governance, culture and talent aspects. **[15]**

G. James Bilefield and Barr Seitz in their Mckinsey article dated April 2016 "Digital Transformation : The three steps to success" opined that to make a digital transformation happen, organizations need complete alignment across organization right from board level to the executive team. They also mentioned that board members across most of the companies are still living in the world of legacy business strategies and are not savvy enough for the digital strategies and hence are unable to support and encourage digital transformation. **[1]**

H. Dan Levin and Barr Seitz in their Mckinsey article dated March 2016 "How technology is creating a new world of work" opined that work of future is moving from being physical to being about information creation and utilization. **[12]**

I. Harrison Lung in their Mckinsey article dated September 2017 "How a large established company built a digital culture" mentioned that digital is actually not much about Information Technology (IT), rather it is much more to do with Customer focus , Agile work methods , and design thinking as key to successful digital transformation. **[13]**

J. Joao Dias , David Hamilton , Christopher Paquette , and Rohit Sood in their Mckinsey article dated March 2017 "How to start building your next-generation operating model" discussed that a successful digital transformation requires one to develop a next generation model that delivers both value and cost optimization. **[5]**

K. Excerpts from a roundtable discussion moderated by Claudio Feser published in Mckinsey article dated March 2016 "Leading in the digital age" discussed that automation can either make a process better, faster and cheaper or it can fundamentally change what a business can offer to its customers. It requires a new business model which will disrupt a business or industry and from that perspective automation today is about reconfiguration, transformation and disruption. **[9]**

L. Tuck Rickards, Kate Smaje, Vik Sohoni in their Mckinsey article dated September 2015 "Transformer in Chief: The new Chief Digital Officer" opined that Chief Digital officer has to assume the role of "Transformer in Chief" to take organization to next level of digital transformation and a true measure of role would be to make this role unnecessary once transformation is over. This role then assumes the role of a CEO as a next career progression so that organization stays ahead of competition from known and unknown disruptive environments at all times. **[14]**

M. Hortense de la Boutetière, Alberto Montagner and Angelika Reich in their Mckinsey research paper dated October 2018 opined that transformations are hard and digital ones are even harder. They have pointed out that even in the digital savvy industries such as high tech, media and telecom industries; the success rate of automation does not exceed 26%. As per their findings, the five factors for success of a digital transformation are as follows: Digital savvy leader in command of transformation; Building capabilities for workforce of future; empowering people to try new ways of working; Digital upgrade of daily use tools and frequent communication using traditional and digital methods. **[2]**

N. Karel Dorner and David Edelman in their Mckinsey article dated July 2015 "What digital really means" described attributes of digital as follows: Value creation for the new business world by value creation in the processes that execute a vision of customer experiences, and building foundational capabilities that support the entire organizational structure. **[6]**

O. Fersht, Phil; Gupta, Saurabh and Christopher, Elena in their web article dated 02 May 2019 titled "RPA is dead. Long Live Integrated Automation Platforms" mentioned that most of the RPA engagements that got signed off are for Attended RPA where RPA just automated rule based and repeatable manual jobs and human support is still required to complete the tasks. This has not created enough Return on Investment (ROI) as processes were not redesigned for jobs to be done unattended. Their research data of 590 global enterprises shows that only 13% of adopters have been able to leverage RPA to their advantage. They have recommended an enterprise-wide approach to automation. **[8]**

Gaps identified from the literature review

Most of the challenges discussed in studied literature provide a macro view of the issues which are quite important but since RPA is still in an evolutionary stage of its development, there is a need to focus on the current technological challenges of RPA from deployment perspective so as to set the stage in order.

Areas to be investigated from identified research gaps are as follows:

There is a need to study automation challenges from the perspective of technology deployment aspects since it has been experienced that the best of the technology and tool fails, if correct technological landscape aspects are overlooked.

III. RESEARCH METHODOLOGY AND OBJECTIVES

Research is defined as a way of investigative thinking. Burns (1997:2) defines research as a "systematic investigation to find answers to a problem" **[11]**

From Application perspective, the current research is an applied research since it will provide insights on major causes of RPA non-performance for the organizations and they would get benefitted from its finding. From Objective perspective, the current research is a descriptive research to better understand challenges around RPA deployment.

The resources for research on Challenges of RPA in BPM industry are as follows:

▪ Review of existing research and literature available around RPA;

▪ Use of online discussions in professional forums of LinkedIn and inputs gathered from NASCCOM conferences like GIC Conclave and BPM Summit;

▪ Brainstorming with few RPA practitioners to understand various types of challenges encountered in their RPA journey;

▪ Analysis of a survey launched where respondents are a group of people directly involved in RPA deployment.

A. **Research Problem:** What are the technology challenges that adversely impacts Robotics Process Automation (RPA) deployment in BPM Industry?

B. **Significance of the study**: Most of the BPM organizations are experimenting with RPA deployment but are seeing mixed results and are in fact seeing more of failures than success. It has been found that even after a successful pilot deployment that gets signed off with solution partners, RPA still gets derailed when put on live production environment at high scale.

C. **Objectives of the Study**: This study is making an attempt to objectively study technological RPA challenges at Micro level so that one is able to avoid common pitfalls that lead to non-performances in RPA deployment in BPM industry from technology deployment perspective.

D. **Limitation and Scope of study**: This study is limited to technology deployment challenges of RPA in the context of BPM industry in India.

E. **Hypotheses framing**: A discussion with few RPA experts led to narrowing down 35 causes that impacts automation and hence the hypothesis framing is as under:

▪ **Null Hypothesis (H0)**: The underlying technology cause does not impact RPA non-performance

▪ **Alternate Hypothesis (H1)**: The underlying technology cause impacts RPA non-performance

IV. ANALYSIS

A survey questionnaire was launched using Google Forms with 35 cases categorized under Process, People and Technology related challenges are examined:

Likert 5 point scale with ranking scale (1-5) was used to record responses with choices as given below:

Strongly Disagree (1) / Somewhat Disagree (2) /Neither Disagree nor Agree (3) /Somewhat Agree (4) /Strongly Agree (5)

Respondents are a select group of Project Managers and users from BPM Industry in India who are directly involved in business process automation initiatives.

A total of 104 responses were received and after filtering down duplicates, we are left with 98 responses to study and analyze data.

A.**Statistical analysis of data:** Validity Test: Likert scale (5 Point) has been used for measuring opinion of Process Automation Project Managers and users. Following steps are taken to validate the questionnaire:

▪ Face validity: Face validity was established by discussing cases with few RPA practitioners from BPM industry on the given topic and questionnaire was evaluated by research supervisors so that it does not contain any double barreled or ambiguous questions.

▪ Cronbach's alpha validation was conducted on total responses and the results are as under:

Case Processing Summary

		N	%
Cases	Valid	98	100.0
	Excluded[a]	0	.0
	Total	98	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.920	35

Statistical Analysis result(s) using SPSS

Cronbach's alpha value of 0.92 shows that questionnaire reliability is Excellent.

▪ Factor Analysis was performed to group cases by related components:

KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.766
Bartlett's Test of Sphericity	Approx. Chi-Square	2297.491
	df	595
	Sig.	.000

Statistical Analysis result(s) using SPSS

KMO test value of .766 shows that sampling is adequate to perform factor analysis.

Bartlett's test of Sphericity is 0.000 which is < 0.05 (significant). This shows that factor analysis will be useful for the data under examination.

Communalities: High communality > 0.5 show that almost all the factors extracted explain most of the variance in the variables being analyzed.

Total Variance Explained: SPSS extracted 8 Factors (components) having eigenvalue > 1 and the cumulative percentage is 70.01% which shows that these 8 factors explain 70% of the variance and which is a good indicator.

Rotated Component Matrix: Rotation: Varimax with option selected to Suppress Small Coefficients with absolute value below 0.5Grouping of cases: Factor analysis cases under same components are further regrouped as People, Process and technology related challenges through brainstorming with few Process Automation experts. Here, we are studying technology challenges as scope of this research paper.

B.Survey data at individual challenges level is summarized in following graph by its mean value in descending order:

Graph I: Individual Technology Deployment Challenges:
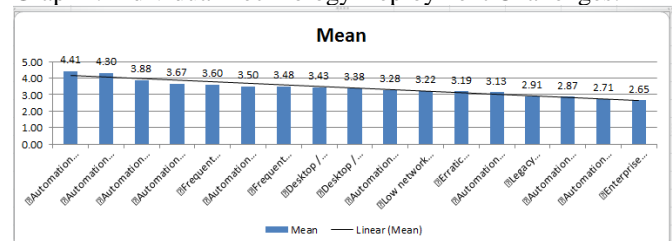
Source: Analysis of Survey Questionnaire

The above graph shows technological challenges that impacts RPA in the descending order of importance by its mean value. From the above graph, we can see the top individual challenges by its Mean value in descending order are as follows in the Table I:

Table I: List of Technology Deployment challenges

Category	Items	Mean
Technology	Automation tool had to fetch inputs from multiple Legacy systems	4.41
Technology	Automation tool had to fetch inputs from multiple versions of ERP system	4.30
Technology	Automation tool was not able to automate End to End process	3.88
Technology	Automation tool was throwing lots of exception for manual fixing by Process SME	3.67
Technology	Frequent changes in Legacy systems by Technology team impacted automation	3.60
Technology	Automation tool was not able to scale up	3.50
Technology	Frequent changes in Enterprise Resource Planning (ERP) system by Technology team impacted automation	3.48
Technology	Desktop / laptop used had slow processor limiting fast processing	3.43
Technology	Desktop / laptop used had low memory limiting fast processing	3.38
Technology	Automation tool was not stable	3.28
Technology	Low network speed at workplace impacted automation	3.22
Technology	Erratic network connectivity at workplace impacted automation	3.19
Technology	Automation solution was throwing errors frequently	3.13
Technology	Legacy systems were not stable	2.91
Technology	Automation solution was not user friendly	2.87
Technology	Automation solution was taking longer time to execute than manual processing	2.71
Technology	Enterprise Resource Planning (ERP) systems were not stable	2.65

Statistical Analysis result(s) using SPSS

C. Let us put all the individual challenges through a hypothesis testing to validate challenges that really impacts Process Automation adversely.

Null Hypothesis (H0): The underlying technological cause does not impact Automation non-performance

Alternate Hypothesis (H1): The underlying technological cause impacts Automation non-performance

V. RESULT AND DISCUSSION

A. Findings from reviewed Literature

▪ Automation strategy is more of a business strategy to solve an organization's critical business problem in this digital era rather than the tool that makes automation possible. Automation has existed in the past as well using Macros, VB Scripts, OCR / ICR and screen scraping technologies that delivered limited value to the business by automating simple rule based jobs. The focus on automation has to enlarge its scope to automating end-to-end processes using new technologies of RPA, AI and Cognitive.

▪ Automation in today's world require a change in business model to go digital since automating current systems and processes without a redesign approach can make little gains through automation particularly when the customer expects a digitally enabled service platform.

▪ RPA deployments are failing miserably on many accounts and many organizations are feeling that automation is more of hype than reality. HfS Research which is a leading research and consulting organization for BPM Industry has declared that piecemeal RPA in silos is dead while the hope is still alive for integrated automation platform.

▪ Many organizations feel that automation is all about technology and they invest heavily on technological aspects. In fact, Cultural and behavioural change poses more challenges than the technology itself. It is recommended that before an organization think of launching automation initiative, it should first create and nurture a culture to give away old ways of working and adopt automation as a new way of life.

▪ Board members, Top executives and all other organizational levels needs to be savvy for the digital transformation and so organizations need to make a sincere investment in relearning opportunities for all levels of organization to be successful in the digital age.

▪ Digital transformation has more to do with creating a next generation operating model that deliver both value and cost optimization.

▪ Automation is not about making a process faster, better and cheaper. It is about making a fundamental change in the way business is performed from customer value perspective.

B. Findings from Survey

▪ The result of Hypothesis testing through Chi-Square Test as shown in Table 2.0 shows that following challenges impacts Process Automation since the "p" value for following challenge is less than alpha value of 0.01 and hence Null Hypothesis is rejected and Alternate Hypothesis is accepted.

Table II: List of validated technological challenges:

Category	Items	Asymp. Sig.
Technology	Automation tool had to fetch inputs from multiple Legacy systems	.000
Technology	Automation tool had to fetch inputs from multiple versions of ERP system	.000
Technology	Automation tool was not able to automate End to End process	.000
Technology	Automation tool was throwing lots of exception for manual fixing by Process SME	.000
Technology	Frequent changes in Legacy systems by Technology team impacted automation	.000
Technology	Automation tool was not able to scale up	.000
Technology	Frequent changes in Enterprise Resource Planning (ERP) systems by Technology team impacted automation	.007
Technology	Desktop / laptop used had slow processor limiting fast processing	.007
Technology	Automation solution was throwing errors frequently	.007

Statistical Analysis result(s) using SPSS

Let's discuss these validated challenges on how they impact RPA deployment and what proposed solutions are.

▪ Automation tool had to fetch inputs from multiple versions of ERP system: It has been found that many organizations across the globe use different versions of ERP systems across various functions / departments like Supply chain and finance etc. and if one function / department is using an upgraded version while other is not, it leads to data not flowing seamlessly to and fro and a processor has to look at multiple upstream systems to search for that relevant missing data input which is time consuming process. Once the RPA solution is implemented on such scenario(s), it leads to BOTS getting into a similar search operations while processing. If there are multiple scenarios like that, it negatively impacts the automated transaction efficiency. It is recommended that organizations should upgrade

▪ their ERP systems across all departments at same time so that there is a seamless flow of data across various ERP modules.

▪ Automation tool had to fetch inputs from multiple Legacy systems: Whenever an organization is looking for inorganic growth, it looks for acquisitions / mergers as a viable strategy. When such acquisitions / mergers happen, it also leads to on-boarding the legacy systems of the acquired or merged entity. This legacy system then gets connected to the main ERP system through the system interface. This interface creates to and fro data flow, but, it is again not seamless and leads to data loss or delayed data flow.

When an RPA solution is implemented, it faces challenges in searching the missing inputs and has to connect to the upstream legacy system to search input data for processing and that causes issues in automated processing. It is recommended that once a company is acquired or merged, the data migration has to be commissioned from legacy system to ERP system as soon as possible so that legacy system can be retired as early as possible. It is not uncommon to see many organizations having complex system architecture with ERP and legacy system living together for many years and this need to change to be successful in the digital age.

▪ Automation tool was not able to automate End-to-End process: Most of the organization deploying RPA try to deploy RPA on As-Is tasks which are being done manually. Then, they attempt to stitch these individual automated tasks to create an End-to-End process. This creates the bigger issue since change in one task can easily break the whole process. It is recommended that the whole end-to-end process needs to be seen with a fresh eye using process mapping, analysis and redesigning to create one Straight through Process (STP) and then only one should attempt to automate it using RPA.

▪ Automation tool was throwing lots of exception for manual fixing by Process SME: RPA is well suited for such processes which are repeatable, rules based, clearly defined and well documented. If an RPA is attempted on a process which does not qualify any of the above criteria, it is likely to create multiple exception handlings which need to be fixed by Process SMEs. It is recommended that all processes in scope of RPA should first go through standardization, simplification and a robust knowledge management system before one should attempt automation.

▪ Frequent changes in Legacy systems by Technology team impacted automation: Legacy system technologies allows interface of RPA at User Interface (UI) level. If there are IT system changes in UI with these legacy systems, it will not allow RPA to perform tasks without errors. It is recommended that the RPA system should interface with Application Program Interface (API) rather than with UI to deliver a robust solution since UI interface makes automation quite brittle as it interacts only at screen level and any change in screen breaks the tool execution.

▪ Automation tool was not able to scale up: As per the Deloitte study conducted in June 2018, it was found that organizations are struggling to scale automation. This study also shows that out of total organization studied, 32% have not yet started on RPA; 37% are in Proof of Concept (POC) stage with 1-5 BOTS; 13% have piloted with 6-10 BOTS; 14% have implemented RPA with 11-50 BOTS and only 4% have achieved substantial scale with 50+ BOTS. The main reasons cited for low scale was fragmented processes (32%) due presence of multiple system and / or system variations; Lack of a clear RPA vision (17%) since people involved in RPA are not able to connect the dots of RPA to solve a business problem and most of the efforts are around automating robotics type work that humans are currently doing and Lack of IT readiness (17%) as IT stakeholders out of all other stakeholders have only recently started appreciating importance of RPA in their current technology landscape and are now thinking seriously on how to integrate their legacy systems and old versions of ERPs with RPA. It is recommended that RPA deployment should have a clearly defined business case to solve a business problem through digitization. Fragmented processes can be controlled through

tool and process standardization as well as simplification. Automation initiative should have full commitment from IT stakeholders to make it successful.

▪ Frequent changes in Enterprise Resource Planning (ERP) systems by Technology team impacted automation: Many of the organizations are still continuing with legacy ERP and these organizations have not thought of upgrading these ERP in many years and even if they have attempted upgrades, it is only for few functions / departments. Whenever, there are some system changes and upgrades in these legacy ERP systems, RPA based processes starts to break down because the RPAs are mostly configured to work with UI and that allows little flexibility to adjust with changes in ERP systems. Most of the RPA product companies are claiming that one can power up the legacy ERP system through BOTS, but, it is not as easy as it is told. It is recommended that organizations having legacy ERP systems like old version of SAP need to upgrade their SAP to newer versions like SAP HANA so that their processes can remain relevant for the consumption based business model besides other benefits like Big Data handling, Scalability, Analytics and flexibility. [16]

▪ Desktop / laptop used had slow processor limiting fast processing: RPA solution has to work with multiple applications and large size files for fast processing and this is not possible with lower configuration processors and RAM in desktops / laptops. It is recommended that organization provide fast processor (Intel Core i7 or equivalent and above) and at least 8 GB RAM on those desktops / laptops where BOTS are being used.

▪ Automation solution was throwing errors frequently: RPA BOTS are created by humans and so they execute exactly as they are programmed to do. Whenever a BOT encounters any unusual situation, it will either break down or highlight it as an exception for human intervention. BOTS can encounter mainly 2 problems: Business and Application exception. A business exception means that there is a business rule that is violated. It is considered normal to have few business exceptions as business rules gets updated due changing business scenarios. An application exception occurs when BOTS tries to establish contact with another application or program, but, is unable to do same and throws an error. It is recommended that RPA should be implemented on such processes which are well defined and documented so that reliance on SME for exception handling is minimized.

It is also important to select an RPA tool which can be modified without a coding change so that process updates do not pose challenge due dynamic nature of business environment. Application exception due connectivity with another application can be managed better if BOTS management system is already in-built in the RPA tool and there is governance around analysis of application error logs and its resolution through a Root Cause Analysis to avoid recurrence of errors. In today's world, many organizations have migrated IT systems to virtual environments. RPA vendors in their latest releases are now providing RPA solutions that can work well with such virtual environment. One of the most commonly use virtual environment in BPM industry is CITRIX and so RPA product companies needs to ensure that their product is compatible with such environments so that automation solutions are robust.

VI. CONCLUSION

Automation deployment in the current time is posing lot of challenges for the BPM industry since many process automation projects are failing at different stages of deployment including some even after a successful pilot is signed off. To effectively leverage automation, one needs to look into solutions for the technology challenges by take into considerations following recommendations:

▪ RPA is currently guided by rules and basically mimics the same operation what the best processor will do. For exception handling, it will still be routed to the SME. The best candidates for early adoption of RPA are those processes where humans work like robots.

▪ People are implementing automation on age old processes and assuming that BOT technology deployment can take care of all nuances around age old processes. It has to be clearly understood that BPM industry stands strong on 3 pillars of People, Process and Technology. If People and Process aspects are not streamlined for digitization, further addition of RPA Technologies alone will not be able to deliver results as desired.

▪ RPA is not about automating age old processes in the back-office that got outsourced few years ago to BPM companies. Organizations that have outsourced these jobs need to relook at their end-to-end processes from a digital customer experience perspective. There is a need to look for redesigning the processes as if one is building processes for a brand new organization where all information inputs and modifications can be done by customer itself in a self-service enabled technology platform.

▪ Automation is a continuum and the progression of automation will happen from attended automation to unattended automation which will be further powered by artificial intelligence and cognitive to make BOTS more intelligent. The continuum will function in following ways: In the initial stage, a part of human work will be taken over by scripted automation with some element of decision making inbuilt in the script. In the later part, scripted automation powered by Artificial Intelligence and Cognitive technologies will take over a large part of the human work to create unattended automation.

▪ In future, RPA will get to a stage of being more similar to human when Artificial Intelligence and Cognitive will get blended with RPA to provide a complete unattended automated solution requiring no human interventions.

REFERENCES

1. Bilefield, James and Seitz, Barr (April 2016) Mckinsey article "Digital Transformation: The three steps to success". Available:
2. https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-transformation-the-three-steps-to-success
3. Boutetière, de la Hortense, Montagner, Alberto and Reich, Angelika (Oct. 2018). Mckinsey research paper "Unlocking success in Digital Transformations". Available:
4. https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Organization/Our%20Insights/Unlocking%20success%20in%20digital%20transformations/Unlocking-success-in-digital-transformations.ashx
5. Catalin, Tanguy, Lorenz, Johannes-Tobias, Sternfels, Bob and Willmot, Paul (March 2017) Mckinsey article "A roadmap for a digital transformation". Available:
6. https://www.mckinsey.com/industries/financial-services/our-insights/a-roadmap-for-a-digital-transformation
7. Daub, Matthias and Wiesinger, Anna Mckinsey article (March 2015) "Acquiring the capabilities you need to go digital". Available;
8. https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/acquiring-the-capabilities-you-need-to-go-digital
9. Dias, Joao, Hamilton, David, Paquette, Christopher, and Sood, Rohit (March 2017) Mckinsey article "How to start building your next-generation operating model". Available:
10. https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/how-to-start-building-your-next-generation-operating-model
11. Dorner, Karel and Edelman, David (July 2015) Mckinsey article "What digital really means". Available:
12. https://www.mckinsey.com/industries/high-tech/our-insights/what-digital-really-means
13. Edelman, David, Dorner, Karel and Seitz, Barr (Feb. 2016) McKinsey article "Achieving a digital state of mind". Available:
14. https://www.mckinsey.com/industries/high-tech/our-insights/achieving-a-digital-state-of-mind
15. Fersht, Phil; Gupta, Saurabh and Christopher, Elena in their web article dated 02 May 2019 titled "RPA is dead. Long Live Integrated Automation Platforms". Available: https://www.horsesforsources.com/rpa-dead-integrated-automation-platforms_041519
16. Feser, Claudio (March 2016) Mckinsey article "Leading in the digital age". Available:
17. https://www.mckinsey.com/featured-insights/leadership/leading-in-the-digital-age
18. Gadre, Ashwin. Jessel, Ben and Gulati, Karan (Nov. 2017) "Rethinking Robotics – Take a step back" in Henley Business School – Capco Institute paper series in Financial Services. Available:
19. https://www.capco.com/Capco-Institute/Journal-46-Automation
20. Kumar, Ranjit. Research Methodology. pp. 1-16
21. Levin, Dan and Seitz, Barr (March 2016) Mckinsey article "How technology is creating a new world of work". Available:
22. https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/how-technology-is-creating-a-new-world-of-work
23. Lung, Harrison (Sep. 2017) Mckinsey article "How a large established company built a digital culture". Available:
24. https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/how-a-large-established-company-built-a-digital-culture
25. Rickards, Tuck, Smaje, Kate, Sohoni, Vik (September 2015) Mckinsey article "Transformer in Chief: The new Chief Digital Officer". Available:
26. https://www.mckinsey.com/business-functions/organization/our-insights/transformer-in-chief-the-new-chief-digital-officer
27. Stefan Biesdorf, Manuel Moller and Franziska Thomas (September 2018) Mckinsey article "Barriers to Digital@Scale – Shifting the focus from tech to culture". Available:
28. https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/barriers-to-digital-at-scale-shifting-the-focus-from-tech-to-culture
29. Strandbygaard, Jens (25 May 2018) web article "4 Benefits of Migrating to SAP HANA". Available: https://gekkobrain.com/blog/4-benefits-of-migrating-to-sap-hana/

AUTHORS PROFILE

Mr. Sumit Mishra is a PhD Research Scholar at Hindustan Institute of Technology & Science, Chennai (India) and has more than 15 years of experience in the BPM industry managing digital operations and transformation working for organizations like Hewlett Packard Enterprise and Accenture etc.

Dr. Sree Devi K K is Assistant Professor in School of Management, Hindustan Institute of Technology & Science at Chennai (India). Her area of Teaching and Research includes Emotional Competence, Human Performance Management, Happiness and well-being, Human Resource Analytics, Business Culture and Ethics.

Technology Dimensions of Automation in Business Process Management Industry

Dr. Badri Narayanan M K is Professor and HOD in School of Management, Hindustan Institute of Technology & Science at Chennai (India). His area of Teaching and Research includes Entrepreneurship, Strategy, Total Quality Management, Family Business, Organizational Theory, Talent Management and Cultural Changes in Organizations, Emotional Intelligence and Strategic Management.