Study on factors determining the success of Robotic Process Automation projects from the employee's perspective

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ABSTRACT

This paper aims at coming up with factors that determine success of Robotic Process Automation projects from employee's perspective. In last 5-7 years RPA usage has increased tremendously in different domains and industries resulting in increased productivity and decreased cost for companies. But still the major threat that employees fear is unemployment, technological shifts or change in their mode of working and getting more and more processes automated may appear as a danger to them, which in turn will reduce their will to work for implementation of RPAs. So, this paper tries and comes up with the criteria that employees think as important for RPA projects to be successful.

Keywords
Efficiendi eum; Apeirian; Omnium; Doctus quaestio congue (Times New Roman, 9)

Article Received: 10 August 2020, Revised: 25 October 2020, Accepted: 18 November 2020

Introduction

Robotic Process Automation is the use of software with Artificial intelligence and machine learning capabilities to handle high volume redundant tasks that previously required humans to perform. There are several misconceptions about RPA. RPA does not replace human cognitive abilities. It does not have a physical form or brain of its own. The working of RPA is done in four phases. The planning phase, development phase, deployment / testing phase and then the maintenance phase to be updated with the changing scenarios and technology. RPA uses some tools that are software which can configure tasks and then automate them. RPA helps in reducing operational rift and thus increasing customer satisfaction. In the area of delivery, it can help in improving the average handling time which in turn increases customer's reliability on the service and ensures full time service continuity. With respect to cost businesses can reduce it and increase their profits to a large extent. It helps in easier software migration, proper utilisation of IT resources. In today world, many industries like banking and finance, IT integration processes, Insurance agencies, marketing and sales readily adapt RPA. RPA has seen tremendous growth in its usage since 2016. It helps in boosting the capabilities of employees and at the same time save money and time. Whether it's a big or small organization, everyone is trying to automate its business processes in a way that it complements strategies made by human, at the same time looking to it that the processes remain uninterrupted.

RPA is a configurable software tool that uses business rule and sequence of actions to automatically complete process in any number of applications the same way a human would, with the help of people for expectation management. In simpler words, RPA is software base robotics that emulates work that people do on front, middle and back offices functions. In order to implement RPA, any company has to adapt the proper automation framework. Before incorporating Automation Framework, employees invest a great deal of time in evaluating, analysing and implementing automation on a process. In later stage, if they discovering the process is not feasible for automation all the hard work goes in vain. To counter this issue, the framework focuses on step by step staegs that any process has to go in order to be eligible for automation. If the process fails to satisfy any requirement at any of these stages it will be disqualified and hence that process will be termed as not eligible for automation. Future is automation and organizations are embracing it. When a client approach for automation, they don't bring one task for automation instead they want numbers of tasks to be automated to save labour cost. However not all tasks can be automated, it is also important to check feasibility to automate, whether it is profitable or not. Decision of automation should be evaluated on the basis of benefits and cost of development.

RPA is a new age technological marvel automating the regular tasks. Performing the tedious tasks can decrease the efficiency of employees and make their work boring leading to decrease in productivity. RPA project managers play a very important and strategic role in its implementation in any company or business. Successful RPA implementation has several goals. The goal of efficiency gain results from achieving objectives like reduction in overhead costs, growth in business without increase in headcount, innovation. Goal of process streamlining resulting from objectives like reduction in execution time of important processes and thus reduction in bottlenecks. Goal of work quality improvement with objectives like decreased turnover, mental and physical wellbeing, reduction in redundation. The four main focus area in any RPA implementation is defining business priorities, defining governance structure for tracking purpose, quantify ROI and customer benefits. RPA has to be measured and aligned with customer's business and intended goals during its implementation. The specific objectives from all stakeholders are gathered to design appropriate solutions.

The customers should get the ability to measure the success from its implementation.

But even after implementing RPA, how can the business performance be measured? The answer to this question can be given in following KPIs- Percentage of processes fully automated. Percentage of work by humans and bots, Comparison of output or productivity between Bot to humans. ROI, Quality of work amd stability of the system in terms of number of escalations. IN order to implement an RPA in a process, automation pipeline is discovered, and then the process is designed, developed and tested. The identification and prioritization of opportunities is a very crucial point in the process. Identify the processes that can be automated, collect data about them and further prioritize them. Automation pipeline is the key element to build deliverables like: Project plan, solution design, develop sprints, deployment plans. RPA increase compliance and compatibility with the existing systems. But not everything works on smoothly and RPA implementation also faces some problems, as in onboarding of employees for this particular task. When it comes to employees who are already satisfied and are used to the kind of work that they are doing, the effect it has on them needs to be studied. Employees can definitely focus more on other strategically important tasks which required their attention before, but does this RPA implementation has only positive effect or are some individuals who are not ready to accept the changing workplace and what are the parameters on the basis of which they measure their satisfaction. Employees might resist due to fear of change in their responsibilities or due to technological shifts. Organizations need to put the realistic expectations in terms of what RPA can and what it is not able to do.

Literature Review

This research paper focusses on finding out factors which affect success of RPA projects through employee's perspective. Their take on topics such as, if they are comfortable in shifting to RPA, what fears they have or do they consider it the correct time for their organisation to transform to RPA technology or if it is of no use there, and many more. Sandra Engberg, Odd Steen (2019) research about effects of Robotic Process Automaton on job characteristics. The study has focused on the five job characteristics: skill variety, task identity, task significance, autonomy, and feedback. Conclusively, the study identified that the employee perceives effects on all job characteristics except from feedback, due to the use of RPA. Their study focused on five job characteristics: skill variety, task identity, task significance, autonomy, and feedback. And as a result, they said that except feedback all employees perceived effect on all characteristics. They took into account factors such as upskilling of employees done for RPA, and also the deskilling that happens if one is shifted to a RPA project without proper training. Forrester (2019) published a report on the impact of RPA on employee experience where they conducted 8 interviews and studied the psychological barriers that stop the growth of RPA on any organisation. They concluded that hey any institute should capitalize on the transforming potential of RPA by keeping employees engaged and happy. Here the employee experience moves to centre stage. The research focussed on developing an iterative management approach from start to ensure that employees understand why the process and what is the intent. RPA frees humans to do what they do best: engage in richer interactions with others, perform work that requires more brain power, and make fewer mistakes. Somayya Madakam, Rajesh M Holmukhe, Durgesh Kumar Jaiswal (2019) investigated for 6 months about the importance of RPA in changing global environment with applications in different and varied fields. But you have to put RPA right place in organisation with right people to get the benefit of its full potential. Because otherwise it will just be an extra process with added risks and cost. An article in businesswre(2019) suggested that keeping employees engaged and happy will be the key in this RPA potential transformation. According to the study, organizations are increasingly concerned with the employee experience as they grapple with the forces of automation and RPA, and that operating model issues and psychological barriers hold back RPA efforts. Ultimately, keeping employees engaged and happy will enable organizations to capitalize on the transformative potential of RPA.

Research Gap

Companies search for opportunities where they can convert tasks into RPA projects, but while doing so they also have to consider the main factor that is 'Human Resource', and their satisfaction. Papers till now deal with benefits of RPA and how they can quantify this success in terms of ROI or profits. But this paper is trying to deal with employee's problems that they face while transitioning to RPA projects, the fear they have of losing their job and what factors do they consider most important during transition or while working on a RPA project.

Research Methodology

As per the objectives of this project, the stress is on finding factors affecting success of RPA projects as per employee's perspective, when their work is transferred to an RPA module or when they are told to work on RPA projects. What are the conditions or factors that lead to satisfaction of the employees? A survey was conducted among employees in various industries and domains to determine the factors and take into account the view of different people working at different locations with individual views. The survey conducted included people at various positions ranging from developers, testers to senior management. The target group was people with relevant work experience in this field. A questionnaire is the backbone of any research and so the survey questionnaire was prepared taking into account, various factors which can affect employee's satisfaction levels.

The questionnaire was divided into four categories. First part dealt with demographic details, work experience and position of the employee. Second part dealt with awareness about RPA, third with benefits from RPA and fourth with issues/ problems related to this. For any project to be successful it is important that the scope is clearly defined and understood by employees working on it. So employees were asked about the scope and id they knew what, why and

how they were doing things. Human judgement is the most critical part here. Even after automating many processes human judgements are still needed. So, it is important to know that how many people think it just as an addition to their workload, still needing their judgement to perform even small tasks. Employees are transferred sometimes to an RPA project, without giving them proper training on RPA, where they are not comfortable working in but they do it in order to save their jobs. Employees were asked if the implementation of RPA will expose/ display the impact and responsibility they have into the work they do, and how does it affect their creativity in work. Sometimes when a task is automated, people cannot see creative ideas in it, and thus the task becomes monotonous. And working in RPA also requires specific upskilling without which people will not be effective in it, and ones who do not get ample opportunity for upskilling themselves will be reluctant and will always have fear of losing their jobs, therefore decreasing their productivity. Also, the various aspects of time pressure and work load is considered which effects employee's efficiency. RPA has various benefits like reduction in manual efforts, faster efficiency, higher speed and throughput, reduced operational errors, improved work process, improved data quality and analytics, easy record keeping, better employee engagement, increased employee productivity and improved customer satisfaction. Employees were asked questions on all these fronts in order to understand what they value the most among these benefits. So that management can keep in mind the factors that employees actually giving importance to, in order to earn their trust. Employees were also asked to rate how hard or easy they found adaptation to the new processes, the new tools and change in organisation's culture. They were asked about various tools they were using in their project s and also if they were provided proper training before start of the project. At the end the employees were asked to rate themselves on the basis of knowledge they have about RPA, even if they are currently deployed in RPA projects.

The data collected from this survey is first cleaned and prepared for further processing. All variables with NA values are omitted or are replaced. Relation between independent and dependent variable are found. Correlation between them is taken into account, in order to understand the relationships. Regression analysis is further done on this data in order to come up with factors that determine success of RPA projects from employee's perspective. Then the paper comes up with a model that will provide all the necessary factors that should be stressed upon by management in order to satisfy the employees and increase their productivity.

Data Attributes

	Description
Satisfaction	Employee satisfaction
WorkEx	Work Experience
WorkingOnRPA project	Worked on a project with RPA tech
MeaningfulTaskEngagement	Do you feel that implementing RPA will enable you to do more meaningful tasks?
IncreaseInCreativity	Do you feel the implementation of RPA leads to an increase in the creativity of employees at work?
NeedToUpskill	Do you feel because of the implementation of RPA you will need to upskill yourself to be relevant in the workforce?
IncreaseInWorkload	Change in Workload?
ReduceDependability	Do you fear that the implementation of RPA will reduce the dependability that others have on you?
HumanJudgementReq	Is human judgment required to do the process being done with RPA in your project?
StillInvolved	Was the process you used to do transferred to RPA and are you still involved in it?
TimePressure	Do you feel RPA will have any impact on time pressure for employees?
DefinedScope	How well is the scope of activities defined in the project
HardAdaptProcess	How hard did you find adapting to the new process?
HardAdaptTool	How hard did you find adapting to the new tool?
HardAdaptCulture?	How hard did you find to adapt to change in organizational culture?
Training	Were you provided training on RPA before the project in your organization?
Success	Success rate of project
KnowledgeOfRPA	How will you rate yourself on the basis of k1wledge you have about RPA?
TakeOverJob	Do you feel RPA will take over your job?

Hypothesis Formation

There is one dependent variable satisfaction and ither independent variables. The aim here is to identify other predictor variables which are significant for employee satisfaction while working in an RPA project or while deploying employees into an RPA project.

Null Hypothesis (Ho): No predictor is able to determine employee satisfaction in RPA projects.

Alternate Hypothesis (Ha): At least one of the predictors is able to predict employee's satisfaction about RPA projects.

Data Analysis and Transformation

- Dataset is checked for missing values and is handles.
- Overview of unique levels for each column is done
- There should be a balance in the target variable, in this case 'satisfaction'.
- Unwanted columns like email id or zip code can be removed from dataset.

- Correlation is found among the variables.

Some inferences from correlation are as follows-

1) Work experience is highly correlated with importance of training. More experienced people give more important to training on RPA.
2) Work ex is negatively correlated with the fact that people are still required to work on projects that are already automated.
3) Work ex is negatively correlated with the adaptation to change in organisation's culture and to the new tools being used.
4) Increase in creativity and still working on the old RPA project are negatively correlated.
5) Increase in creativity and reduction in dependability & human judgement required are negatively correlated.
6) Reduction in dependability is negatively correlated with need to upskill, increase in creativity and increase in workload.
7) Defined scope of a project is positively correlated with how employees perceive success of the RPA project in their organization. Whether it is too early, on time, on not required at all.
8) People rate themselves low on knowledge about RPA that they have, if they have not been provided proper training on it.
9) The dependent variable is highly positively correlated with increase in creativity, training and negatively with reduction in dependability, requirement for human judgement, upskills required.
10) Their thoughts on meaningful task engagement is positive if they have been given proper training on RPA and if they found increase in creativity in their tasks as their mundane and repetitive tasks were automated.

Model Formation and Interpretation

For a classification problem, it is important to ensure that the train and test sets have approximately same percentage of samples of each target class. So stratified sampling is done and then the whole dataset is divided into test and train data. Training to the dataset is given on train dataset and then testing is done on test dataset.

Modell 1

In the first model we are using all the independent variables without considering the interdependence between variables. Below is the summary of first model which is called by function glm() for logistic regression.

```
> summary(model1)

Call:
glm(formula = Satisfaction ~ ., family = binomial(link = "logit"),
    data = training)

Deviance Residuals:
       Min          1Q      Median          3Q         Max
-3.971e-06  -3.971e-06   3.971e-06   3.971e-06   3.971e-06

Coefficients: (1 not defined because of singularities)
                                   Estimate Std. Error z value Pr(>|z|)
(Intercept)                      -7.670e+01  8.616e+05       0        1
WorkEx                            1.798e-07  5.805e+04       0        1
WorkingOnRPA.project                     NA         NA      NA       NA
MeaningfulTaskEngagement          2.602e-07  1.292e+05       0        1
IncreaseInCreativity              1.336e-07  7.401e+04       0        1
NeedToUpskill                     6.507e-07  1.104e+05       0        1
IncreaseInWorkload               -8.473e-07  1.062e+05       0        1
ReduceDependability               2.061e-09  8.371e+04       0        1
HumanJudgementReq                -4.096e-07  1.451e+05       0        1
StillInvolved                    -1.927e-07  1.909e+05       0        1
TimePressure                     -1.519e-07  1.341e+05       0        1
DefinedScope                     -1.990e-07  1.053e+05       0        1
HardAdaptProcess                  3.933e-07  2.687e+05       0        1
HardAdaptTool                    -4.484e-07  2.857e+05       0        1
HardAdaptCulture.                 1.150e-07  7.838e+04       0        1
Training                          5.113e+01  2.329e+05       0        1
Success                          -2.720e-07  8.507e+04       0        1
KnowledgeOfRPA                   -5.409e-08  9.662e+04       0        1
TakeOverJob                      -3.324e-08  6.070e+04       0        1
FeelingOnGettingMundane.TaskAutomated -3.115e-07  9.936e+04       0        1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 3.8673e+01  on 27  degrees of freedom
Residual deviance: 4.4156e-10  on  9  degrees of freedom
  (156 observations deleted due to missingness)
AIC: 38

Number of Fisher Scoring iterations: 24
```

Interpretation

The three most significant variables here as per the above summary are-

1. IncreaseInWorkLoad – As this has a negative impact on employee's satisfaction.
2. Training – As this has a positive impact on satisfaction levels.
3. NeedToUpskill

Also, the AIC score here is 38. AIC is Akaike Information criteria and is a measure of statistical model for a given dataset, in relation to other models. So, this model will be refined in next stages and then the AIC for models will be compared. The model's performance is evaluated using model significance tests, robustness check, Heteroscedasticity check and ROC plot. And then the best model is selected.

Model 2

In second model out of all the independent variables, some variables like work experience, still working on the same project, human judgement and reduction in dependability were removed. And the resulting summary of this new model is below-

```
> summary(model2)

Call:
glm(formula = Satisfaction ~ . - WorkEx - WorkingOnRPA.project -
    ReduceDependability - HumanJudgementReq, family = binomial(link = "logit"),
    data = training)

Deviance Residuals:
      Min         1Q     Median         3Q        Max
-3.971e-06  -3.971e-06   3.971e-06   3.971e-06   3.971e-06

Coefficients:
                                   Estimate Std. Error z value Pr(>|z|)
(Intercept)                       -7.670e+01  5.233e+05       0        1
MeaningfulTaskEngagement          -2.116e-07  9.323e+04       0        1
IncreaseInCreativity              -2.358e-07  6.871e+04       0        1
NeedToUpskill                     -2.592e-07  1.083e+05       0        1
IncreaseInWorkload                 9.962e-08  9.348e+04       0        1
StillInvolved                     -9.568e-08  1.381e+05       0        1
TimePressure                       1.075e-07  1.146e+05       0        1
DefinedScope                       4.108e-08  8.596e+04       0        1
HardAdaptProcess                   1.090e-08  2.562e+05       0        1
HardAdaptTool                      8.455e-08  2.574e+05       0        1
HardAdaptCulture.                  3.255e-07  7.405e+04       0        1
Training                           5.113e+01  2.219e+05       0        1
Success                            2.044e-07  7.597e+04       0        1
KnowledgeOfRPA                    -3.010e-07  7.384e+04       0        1
TakeOverJob                       -5.824e-08  4.778e+04       0        1
FeelingOnGettingMundane.TaskAutomated  2.888e-07  8.896e+04       0        1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 3.8673e+01  on 27  degrees of freedom
Residual deviance: 4.4156e-10  on 12  degrees of freedom
  (156 observations deleted due to missingness)
AIC: 32

Number of Fisher Scoring iterations: 24
```

Interpretation

Below are some of the significant variables as per the above model-

1. Increase in work load
2. Hard in adaptation
3. Training
4. Take Over Job

The null deviance is 27 degrees and when other variables are added to it then it reduces to 12 which is good for any model. The AIC for this model is 32, which is better than model 1. Model accuracy, robustness and significance are checked for this model and then the model is refined in net stages.

Model 3

In this final stage, the model is more refined and the variables which were more impacting the dependent variable 'Satisfaction' are taken. The variables in this model are- Meaningful Task Engagement, increase in creativity, Time Pressure, Defined Scope, Hard to adapt to cultural changes, Training, Perceived success, Fear of taking over job.

```
> summary(model3)

Call:
glm(formula = Satisfaction ~ . - HardAdaptTool - StillInvolved -
    FeelingOnGettingMundane.TaskAutomated - NeedToUpskill - IncreaseInWorkload -
    HardAdaptProcess - WorkEx - WorkingOnRPA.project - ReduceDependability -
    HumanJudgementReq, family = binomial(link = "logit"), data = training)

Deviance Residuals:
      Min         1Q     Median         3Q        Max
-3.971e-06  -3.971e-06   3.971e-06   3.971e-06   3.971e-06

Coefficients:
                          Estimate Std. Error z value Pr(>|z|)
(Intercept)              -7.670e+01  3.982e+05       0        1
MeaningfulTaskEngagement  2.594e-10  8.214e+04       0        1
IncreaseInCreativity      8.607e-10  7.304e+04       0        1
TimePressure              1.316e-11  1.057e+05       0        1
DefinedScope              3.699e-10  5.958e+04       0        1
HardAdaptCulture.        -7.936e-10  5.732e+04       0        1
Training                  5.113e+01  2.367e+05       0        1
Success                   7.035e-11  6.595e+04       0        1
KnowledgeOfRPA           -7.634e-10  7.471e+04       0        1
TakeOverJob               4.210e-11  5.282e+04       0        1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 4.1455e+01  on 29  degrees of freedom
Residual deviance: 4.7310e-10  on 20  degrees of freedom
  (154 observations deleted due to missingness)
AIC: 20
```

Interpretation

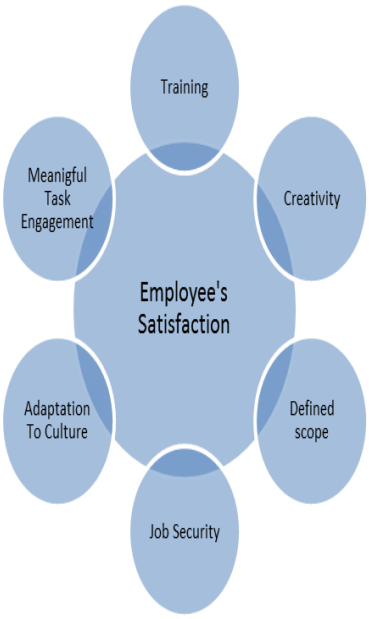
This model's AIC is 20, which is the lowest among the above models. Training, Perceived success of project, increase in creativity are some of the variables which positively affect employee's satisfaction levels. Null deviance is on 29 degrees of freedom, and when other independent variables are added then it gets reduced to 20 degrees. The independent variables in this model are less correlated with each other and more on the dependent variable 'Satisfaction'.

Findings and Suggested Model

According to the objective of this paper, that is to find factors that affect employee's satisfaction levels while working on RPA projects or while being transitioned to RPA projects, the third model helps to identify them.

- The null hypothesis is rejected and the alternate hypothesis, that is at least some of the independent variables are able to predict dependent variable 'Satisfaction'.
- While being engaged in a RPA project, it is important that employees engage themselves in meaningful task which do not hamper their creativity levels, and they feel productive.
- The scope of project should be well defined. That is, why are they transferring to RPA and what are the advantages of doing so, and if they are doing so, what will ne the next steps in their carrier progression.
- People find it hard to adapt to the change in culture while RPA is being adapted in an organization. So, management has to take care of that aspect.

- Training plays a very important role in employee's satisfaction. Without giving proper training to employees on RPA, they should not be deployed on RPA related projects.
- A question was asked to employees about how they perceive the success of RPA project in their organization. Whether it was too early, on time, or of no use. People who were trained and the scope of project was clearly defined to them, they were able to think the project in their organization a s a successful one. Others were in dilemma.
- A fear that is very common about RPA among employees is the fear of losing jobs, when manual tasks will be automated. Management has to keep the employees motivated and convince them about their job security.



Conclusion

- Out of the variables selected for questionnaire, the independent variables which are not more correlated with each other but with dependent variable 'satisfaction' are- Training, creativity, defined scope, job security, adaptation to culture, meaningful task engagement.
- Employees when are trained feel more confident about the project they are working on and thus are more confident on the knowledge they have about RPA.
- Management should look into it that the scope of project is clearly defined to employees, so that they are clear about what they are doing and are thus motivated to see the result of their efforts.
- People do not want to be stuck at a place, but want to upskill themselves and also engage themselves in creative tasks. Management should look into it that the people who earlier worked on RPA project, are still not doing the same mundane tasks, but are upskilled on something relevant.
- The biggest threat employees face from RPA is danger to their jobs. Management should make sure that workforce feel sure about their job, are properly upskilled so that their skills can be utilized somewhere else.
- Employees sometimes find it difficult to adapt themselves to the change n culture that is happening in the workplace due to adaptation of RPA. Work experience people with more than 15 years of experience, might find it hard to get adapted to new tools and processes which they are not used to. So, management has to take appropriate decisions and actions on all these variables.

Limitations

- The reach of the questionnaire was not so wide, in order to record all existing answers and beliefs.
- This paper is just a take on employee's perspective and satisfaction level taking into account variables resent in the working scenario. Some variables covering cost and time aspects are not included in this paper.
- Employee's views vary from company to company as different practices are followed in different organizations.

Future Scope

- In future this research paper can be extended by including variables that covers cost and time saving aspects.
- Data collected should be more varied industries like FMCG, automobile.

Segmentation can be done based on different industry selected, as different industries follow different practices and thus transitioning to RPA has different effect on employees.

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