

Design, Development and Testing of Softbot for Process Optimization in FMCG Industries Using AI and RPA Technology: A Survey

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Abstract—Following Industrial Revolution 4.0, many businesses are modernising their work and production environments. Redesigning the organisational structure ensures better decisions and market predictions. Supply and demand affect the market for FMCG items. Existing data and information must be analysed to forecast inequality. Automation boosts manufacturing output, cuts costs, and shortens turnaround times. AI and IOT make data collection and analysis easier. By collecting, analysing, and interpreting data, one may predict the future and improve supply chain management. Leading enterprises in the FMCG, petrochemical, automobile, etc. industries used automated systems for raw material processing, packaging, manufacturing, and shipping, together with a remote central monitoring system. Automating front and back offices cuts expenses and processing time. Robotic process automation creates automated systems that copy, learn from, and perform business processes like humans. RPA can automate manual business tasks. After using RPA, the company can redeploy its workers to decision-making positions. RPA reduced process time, saved inventory, boosted accuracy, and eliminated human error. To optimise the business process, real-time data must be gathered from numerous sources, separated from huge data, stored in a specific region, and decisions made based on it. SoftBot completes this task without human assistance.

A.I. automates functions requiring human intelligence, such as perception, manipulation, reasoning, communication, and learning. By combining RPA and AI, smarter bots can do numerous jobs at once. This can execute jobs quickly, analyse various data sets, and communicate and receive massive data in real time. This initiative lets employees focus on other strategic company activities. This research adds to the design and development of a SoftBot to reduce human effort, save time, provide trustworthy data without error, and offer suggestions for improving KPIs and creating organisational goals.

Keywords— RPA, Artificial Intelligence, Automation and Robotics, SoftBot, Business process etc.

I. INTRODUCTION

The globe is seeing an increase in technological innovation across many industries. Innovators work to advance technology in every aspect of human society in an effort to boost output and improve quality of life. Automation has lowered the need for people to pay attention and exert effort, while increasing production per worker. In the end, it aided the expansion of society in both the economic and technical spheres. Automation has initially revolutionized a number of sectors with extensive mechanical activities. For instance, cropping and cultivation in a farm once needed a lot of labor, but this has changed thanks to technology and automated machinery. Farmers simply need the knowledge to perform equipment maintenance and troubleshooting today as opposed to a few years ago when they had to do everything manually for agriculture and dairy production. The second example of automated industries is the automobile sector, where company operations and equipment handling have been completely revolutionized by technology. Car manufacturing and assembly were initially done by hand. Following then, the development of the assembly line and advancements in robots have greatly altered several sectors.

Data transformation and data manipulation are two crucial components of the basic IT activity. For instance, any organization's payroll system requires input information in order to determine employee compensation. Depending on the level of automation, a new element must be discovered to automate the fundamental tasks. Data from the cloud can be sent and received via an automated file transfer system, and in some situations, data manipulation tasks involving several files can be completed automatically with the use of VBA macros in an Excel spreadsheet. Lessening ability to import and transfer files is the difficult issue for increasing use of automation. These systems are typically outmoded and poorly maintained legacy systems. Any system that has gained traction and a sizable enough consumer base cannot be readily replaced. Applications that use online forms and the cloud frequently do not support importing files. The cost may be the most important aspect, but these systems' features are also being modified and upgraded, which adds to the cost. Whatever

the barrier, the usage of automatic systems and further advancements in automation technology necessitate a new solution in order to increase production.

Robotic process automation (RPA) is a software-based technology used to automate computer-based digital operations. Robots, or "bots," take the place of human employees and carry out tasks without the need for direct human interaction. By navigating the pointer for UI, RPA can carry out the duties with software applications. These jobs worked well with outdated systems since a bot can perform tasks like filling out forms or entering data into sheets much like a man would. With the use of technology, RPA can close this gap and automate many more activities across a wide range of industries. RPA's advantages include its ability to operate around-the-clock, its quick execution, and its increased data accuracy.

Although "Robotic Process Automation" (RPA) evokes thoughts of machines performing human work, in reality, it refers to a software solution. A "robot" in the sense of RPA is a piece of software. RPA refers to the technical extrapolation of a human worker for business operations, with the goal of completing standardized and repetitive tasks (which are frequently found in ERP systems or productivity tools) rapidly and profitably [1]. You could say that RPA tries to replace people with automation that is carried out from the outside in. This is distinct from the traditional inside-out approach to information system improvement" [2].

According to the Institute for Robotic Process Automation and Artificial Intelligence (IRPA-AI) [3], adopting RPA indicates a minimal level of intrusiveness because this technology sits on top of existing IT infrastructure rather than being integrated into it.

The method, people, and technology make up the three crucial components of an RPA implementation process. Change management has been regarded as a well-recognized component of RPA technology, claim Willcocks et al. ([4]). Since RPA is built on top of already-existing infrastructure and processes, the working process flow may also come from individuals with knowledge of how to carry out the activities necessary to accomplish the objective of the specific system that the bots will be carrying out. As a result, the RPA process can be handled carefully due to the presence of human actions. In order to manage the usage of RPA with respect to change management theories in any industry, it is necessary to assess both the significance of the technology (i.e. what is required to automate a process) and how to do so.

AI can be regarded of as a computer system simulating human intelligent thought processes, with processes like automatic understanding, planning, explanation, self-correction, and execution included. Nevertheless, individual judgments and theories are developed, and the actual problem-solving is carried out by means of logical and mathematical algorithms. "If a typical person can accomplish a mental activity with less than one second of thought when it arises, we can probably automate it using AI either now or in the near future," said Andrew Ng, professor at Stanford University and former vice president and chief scientist of Baidu. Ng Andrew [5].

It may also improve the corporate working culture and employee job satisfaction by automating tedious tasks. According to the authors' perspective, the fourth, eighth, and ninth Sustainable Development Goals of the United Nations are related to the automation of laborious work (Figure 1). The 2030 Agenda for Sustainable Development includes this objective (UN General Assembly, [6]). To obtain the desired result in education, a teacher may need to devote more time to providing high-quality instruction rather than administrative responsibilities.

The Millennium Development Goals (MDGs), whose time of achievement ends in 2015, were replaced with the Sustainable Development Goals (SDGs) during the 2012 United Nations Conference on Sustainable Development (Rio+20). Beyond 2015, the SDGs must be integrated into the UN's global development agenda, address all three aspects of sustainable development (environmental, economic, and social), and be consistent with it. The proposed SDGs cover the period from 2015 to 2030.



Figure 1: United Nations Sustainable Development Goals [6]

The SDGs include mention to disability in a number of places, including those dealing with inequality, human settlement accessibility, growth and employment, education, and data collecting and monitoring.

II. LITERATURE REVIEW

Lacity et al. [7] claim that when people think of RPA, they always picture a physical robot that can walk around and carry out human-like tasks. According to Lacity & Willcocks [8-9], the concept of robotic software configuration involves configuring a robotic software programme to perform the tasks, interacting with various applications such as spreadsheets, client relationship management (CRM) systems, or ERP software. As with all machine automation, the conception entails replacing processes that were previously completed by humans. RPA offers the following tools in total: a software-oriented platform, logically well-structured processes, systematic data, and legal set-rules as per Lacity & Willcocks [10].

The jobs are usually monotonous and less appealing to complete by hand, according to Willcocks et al. [10]. Swivel presidency duties are similar ones that involve passing inputs from one side to workers from the other side without giving them any thought. RPA, or robotic process automation, carried out tasks just like humans would while using computers. If a robot were given a specific, clearly defined task to complete, it would do so accurately while also saving time and money. Industrial robots of the machine type are not used in RPA, but an estimation of the robots based on automated processes is necessary. One robot needed a single software license to function in the context of RPA. The robots can be utilized around the clock, but a license is needed to operate them. For instance, 10 robots or licenses are required to perform 10 processes simultaneously.

The following repetitive jobs are suitable because redundancy typically results in employee mistakes. RPA can benefit from understanding the relevance of the Telefonica O2 research in the UK. They created a concept for an automatable band. That is depicted in Figure 2. The graph between transaction volume and process length is shown in the diagram below. According to this graph, a process must achieve a specific time saving in order to be considered a target process. This was dependent on either a large amount of brief operations, a low volume of lengthy processes, or a combination of both.

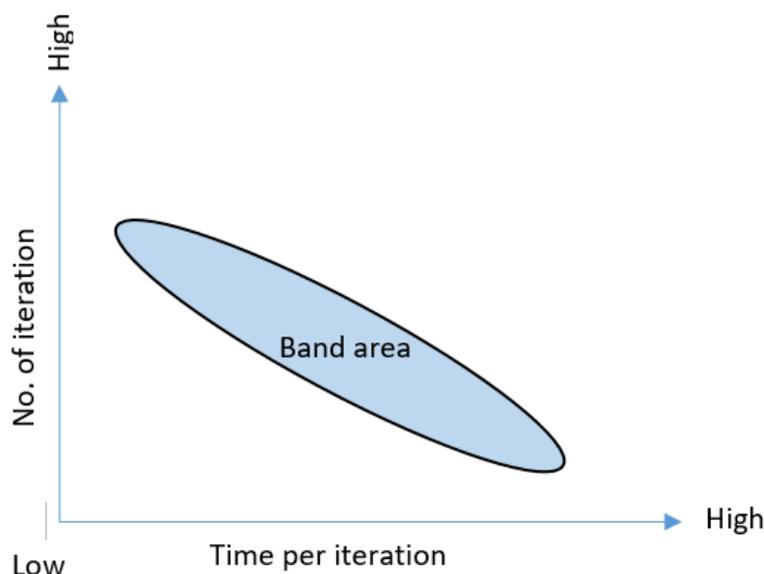


Figure 2: The automatable band suitable for target process

The automatable band should apply to all automated processes, not just RPA, in accordance with Lacity et al[8] .'s recommendation. Business Process Management is an example of an automation tool that is more practical (BPM). This idea is a technique that seeks to evaluate and improve a company's situation in a continuous manner for greater improvements.

According to Zairi M. [11], BPM is most typically employed in fields with similar uses because doing so provides greater benefits. However, even a minor improvement can have a significant impact on production. The foundation of BPM is mapping and defining conditions, evaluating their efficacy, and optimizing the processes. To sum up, BPM is a comprehensive methodology for framing and improving business processes. RPA uses the user interface level without using a direct link to a database, whereas BPM provides a wide access to the reverse-end of systems. As stated before, the designer just needs to be exposed to the process in its overall sense to possess the competences required for RPA.

As a result of the enormous variety of generalities they must know, BPM inventors need more experience. Eventually, the testing requirements change once more; RPA is simpler and only requires yield validation, whereas BPM is new software and requires system testing. The degree of element application is high in both BPM and RPA, but in BPM this is more difficult; with RPA, reusing principles is genuinely smooth. Table 1 displays the features of both systems.

Table 1: BPM and RPA compared

Attribute	BPM	RPA
Business Goal	Re-engineer process	Automate process
Technical Outcome	New software	Automated process using current software
Integration Method	Heavyweight, access business logic layer	Lightweight, access user interface
Developer competence	Extensive, software development	Modest, process expertise
Testing requirements	System testing	Output verification
Component reuse	High, difficult	High, easy
Payback time	years	Months

Robots can be utilized to improve and accelerate human strengths, meaning humans will accomplish their task on schedule, according to Lacity & Willcocks [8]. Describe this using a journalistic example. Journalists loathed assignments that promised straightforward, repetitive reporting that was similar to commercial earnings. By automating these tasks, the business was able to direct its correspondents' attention on reporting on further innovative stories. By using robots, not only did the volume of earning reports increase tenfold, but it did so without incurring additional costs, and customers were

pleased with the quick turnaround and improved quality. All of the correspondents were able to focus on more interesting areas of their professions while still keeping their jobs.

Organizations are aware of how crucial it is to collect pertinent information for correct forecasting decisions in order to guarantee optimum profits and desired results. Collecting and analyzing data for decisions is a difficult chore for businesses and RPA experts without the aid of AI technologies. In order to forecast future decisions accurately, machine learning systems have been built to adapt to data collection and analysis related to historical situations and current supply chain management activities.

Regarding the FMCG sector, operational aspects including supply chain management, production choices, storage, and logistics are elements that require precise planning and decision-making on the creation of consumer goods. The supply chain management system's primary goal would be to organize the production of consumable units that could be converted to meet demand. Making accurate inventory selections is essential when producing goods with a short shelf life to prevent overstocking or understocking, which could ultimately result in significant financial losses in sales. The entire organization may be negatively impacted by inaccurate inventory decisions and incorrect productivity estimates.

According to Arto et al[12] .s definition of design, it must have a specific temporal period with a beginning and an end. Although the temporal aspect of strategies is highlighted by this description, it might occasionally be advantageous to include steps that occurred before and after the road map itself. As a result, there is just one description of the design life cycle, which consists of four phases (Figure 3) of work stages without a plan.



Figure 3: Project life cycle for RPA process

According to Pinto & Slevin [13], the plan involves several phases. Together, the authors refer to this project life cycle as the system work phase, excluding the planning and execution phases of the design. There are four significant stages to the design process. Conceptualization, Planning, Execution, and Termination are depicted in Figure 4, and Table 2 summarizes their contents. The conceptualization stage is when the scheme is specified. In this stage, it's important to consider why the design is necessary, as well as what goals and principles it ought to follow.

All of the conditions claimed for the project is described and listed at the planning process. This step provides a timeline for the design planning and resource identification. When the job is completed to a sufficient level, implementation is complete. This is the phase of the project life cycle that is most visible and tangible to the clients. Termination is the final stage, which entails wrapping up the project design and turning it over to the clients or owners. This step entails finishing the design proof and giving the users access to all the data.



Figure 4: Systematic development phases of a project

Table 2: Summary of project phases and descriptions.

Stapes of Project phases	Contents
Initial	Select idea, chosen of provider
Conceptualization	Project specification and scope
Planning	Plan, schedule, resource allocate
Execution	Work on project and develop it
Termination	Finalize documents and training

Help and support	Give support and suggestions
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Parr & Shanks [14] conducted research on the phases of an ERP system's project phase. They separated the project development process into six steps. Setting up comes first, followed by re-engineering, design, configuration and testing, and installation. Combining the conceptualization and planning phases to create an enhancement phase is what Parr & Shanks did. Figure 5.

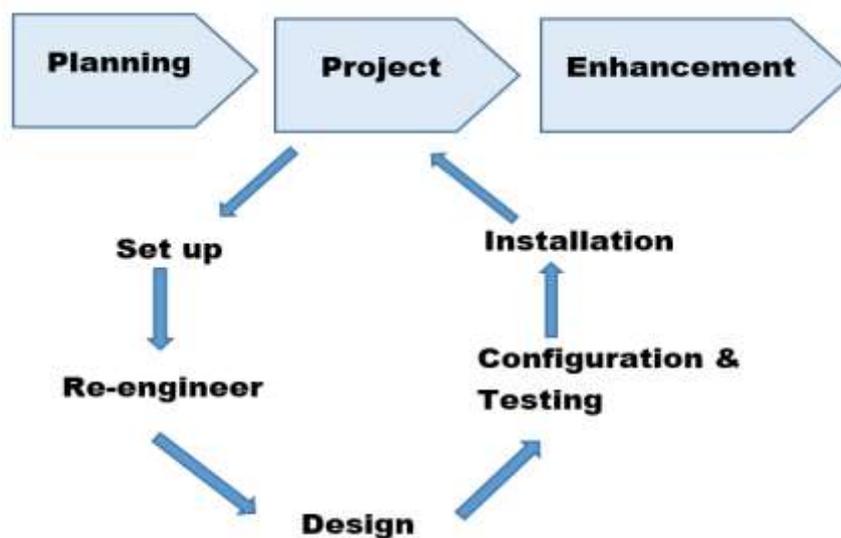


Figure 5: Phases of an ERP implementation

According to Pinto & Slevin [13], defining project success is a necessary first step in the process of developing successful designs. After project operation success and product success, there are two important concepts. Success in project management is measured by how well a plan and strategy process accomplish their goals in terms of money, time, and quality. The project must also be approved by the clients. Product success is dependent on the features of the finished item, particularly how its needs are met. The fact that these two extents have different success variables and that either one could fail while the other succeeds must be emphasized.

It is simple to confuse these two areas of success for RPA design, according to Baccarini [15], because they are comparable in many aspects. However, it's important to distinguish between product success and design operation. The importance of the two sorts of accomplishments can be ranked, with product success coming out ahead of design and operation success. Since the consumer is the one who actually utilizes the product, it might be argued that their conclusion is more important than the operation company's. Figure 2.5 illustrates this scale, whereby the project's goal and target are dispersed under product success while yields and inputs are tools for the project's operation success.

The definition of the goal is how the system will be suited to assist the industries in achieving their strategic goals. The object explains why the system is necessary in the context of a larger picture. A slightly more immediate goal of the design is expressed in the Purpose of the design. Purpose is subordinate to objective in the hierarchy since it gives the implicit tools needed to complete the task. The design deliverable in the classic sense is the project output, which is the tangible and transient result of a project. The materials utilized to complete the design are referred to as project inputs. These resources, which can be described using the three standard project metrics of extent, schedule, and cost, include financial resources. These considerations are frequently created as an ordering yields serve as a tool to complete purpose, and input, similarly, is a tool to complete the outcome. Figure 6 highlights this scale. [15]

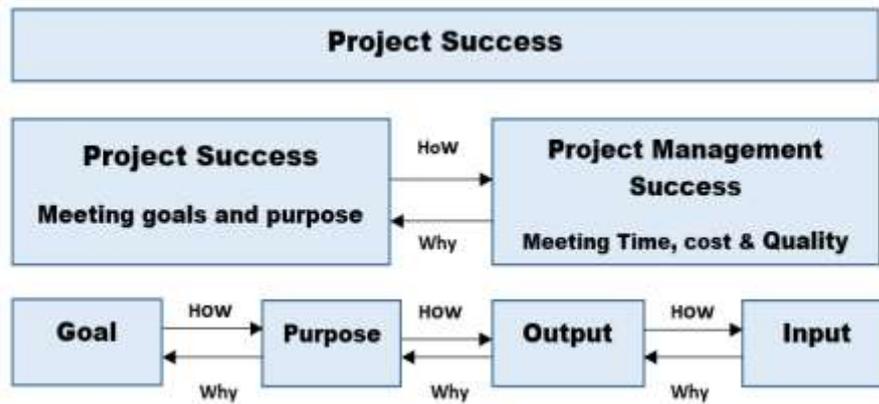


Figure 6: Hierarchy of the project success

Top administration support is one of the more prevalent elements, according to Somers & Nelson [16]. The top administration must agree and approve the execution in order to enable distinct completion of a design. A plan's definition of specific ideas and objectives is crucial). With specific objectives, it is easy to determine whether they are feasible or not, and they also serve to direct participants in the appropriate direction. From the opposite angle, poorly defined, frequently colliding objectives result in failure. The activity of prospects is essentially bound to objects.

According to Parr et al. [17], user involvement is one CSF for tactics. This component has several personalities, some of which are more linear in terms of user interaction and customer argument user participation than others. The bottom line states that in order for a plan to be successful, the client must be heard, and the design must be informed by the customer's genuine needs. The customer must be involved in the project's design.

Ashrafi & Hartman [18], Customer satisfaction is closely tied to other CSFs, particularly user participation and expectation management. Since the plan is required by the users, it should be a top priority to satisfy their needs and expectations. Owner's approval is another name for this CSF, which, while not exactly the same, carries the similar message that the design must be managed to meet its requirements and win user approval. If people are not satisfied with the solutions, they are unlikely to utilise them to their full potential. This CSF also connects to the design success factor of product success.

III. MATERIALS AND METHODS

Various businesses operate in the global FMCG sector. Throughout the entire year, they operate around the clock, twenty-four hours a day. This covers the manufacture and packaging of cosmetics, personal care items, home appliances, over-the-counter medications, food and beverages, etc. Automation is primarily used in the production and processing divisions. The system required to manage the data base and its evaluation is quite heavy for everything from purchase requisition through material reception, products movement inside the plant, final finished product storage and its inventory, product dispatch, supply chain, and logistics. Robots and other physical equipment are available for physical movement and packaging, however maintaining the data in SAP and ERP is done by hand. Various businesses have adopted RPA inside the organization to perform this type of work automatically in order to improve data management and storage. As a result, the author provided a case study of RPA that was used in an FMCG company.

Case study #1:

Australia based FMCG Food Company, which has implemented the RPA using Uipath to automate delivery confirmation in ERP. They have completed the robot implementation within period of one week. They used UiPath platform with Studio + Orchestrator + unattended robots RPA infrastructure for development of softbot. After implementation of RPA following task done by robot automatically without any human interaction. [19]

- The robot is Read the incoming files, extract the required data from it and rename delivery docket using .pdf files for further process
- Then Upload each document reference id and match with sales order which is connected with NetSuite Cloud ERP portal of organization
- Then generate the Report of any non-matched deliveries
- Send the file log generated by robot to cloud ERP and this data can be accessed any time

Case study #2:

According to one of the leading RPA service provider **JKTECK**, they developed automatic system for one prestigious FMCG company that digitally transforms the Sales Reporting Process and achieves 100% accuracy using RPA automation tool. [20]

The Client

Customer is reputed fast-Moving Consumer Goods Company with a heritage of over 80 years. This company process and manufacture the various products include food and beverages, cleaning agents, beauty and personal care products.

The Challenges

There are various challenges in automating the process were:

- Because of high volume of data and the corresponding sensitivity, it is very difficult for the client to generate sales reports manually using different transformation logic and collaborating software.
- As this was the manually process to generate the data reports It took more time, changes of error in the reports and required regulated data handling between the other tools. However, data security and integrity are mandatory in any industry.
- In addition, the client is working 24*7 round the clock. Therefore, they required 24 hrs continuous support for its operation and maintenance.

The Objective

Being market leader in the FMCG industry, the client has a various products in different categories. Client's IT and analytic Department was collect the products and processing data from multiple resources within organization and present them regularly in front of management for decision making in various categories. Because this data gathering was connected with various departments, it was very tedious and time-consuming process. Furthermore, while taking decision within the industry this may gain leads to errors due to human involvement in the process and report generation. Therefore, the customer wants the system or tool that works automatically and give all the data such as real time processing data, comprehensive reports creation, and email communicating precisely within particular timeframe.

Case study #3:

MAS Holdings a leading South Asian apparel and textile manufacturer has an excellent automation story that starts with a small proof of concept (PoC) to make automate the labour order placement system.

Initially they implement the RPA in small area of enterprise and they got the satisfactory business value results. After that, they encouraged the team to look for more opportunities in company, which then turned into an enterprise-wide implementation to make many processes automatable.

To evaluate the annual growth of company they have analysed the RPA implementation in processes to be automatable: From beginning, they used just 7 processes to make automated that was in 2017 and till 2021 they make 52 processes automated. These processes are mostly based on SAP ERP and range widely from product development and procurement to shipping to commercial market.

Case study #4:

The **Europe** based **Schneider Electric** Company provides energy and automation digital solutions to various industries. It includes homes, buildings, data centres, and manufacturing industries. It has a strong culture and follow up of lean management. Therefore, company is working for an objective to eliminate tasks, which has no benefit — i.e. eliminating waste by following the lean approach. They want to empower and train their employees, make them self-reliant, and refocus them on core activities to lead the customer satisfaction. [21]

The core areas where the company has implemented the RPA is given below:

[1] Repetitive document preparation process elimination by RPA

At one of Schneider Electric's industrial sites in Europe where the dedicated workers was assigned to prepare and print documents for operators/ technicians who install electrical switchboards at client's location. The task to prepare these documents with details of manufacturing of switchboards, and labels that identify electrical circuits and circuit breakers are very much complicated, time consuming, and does not add much value. By using RPA tool, they developed a robot in just 2½ days by IT expert. Now, this robot is used to opens and prints these documents whenever needed and make freeing up 2 employees. This work is even more precise and accurate than human labour.

[2] Increasing the speed of work flows in the midst of a health crisis during COVID

During worldwide COVID-19 pandemic, the Schneider Electric was developed new supply chain system that implemented the different sites in Europe to supply the personal protective equipment (PPE) from an international distribution centre to other countries. Before RPA, the order processing was manual and time-consuming, taking up one-two person's workload because this new centre was not connected with ERP. After RPA execution, order-processing time and invoice generation was reduced from 4 hours to 2 minutes. Because of this, now the company can process the large number of orders with few minutes. Moreover, if errors comes, that flagged quickly and easily rectified.

Case study #5:

Amber Beverage Group (ABG) is a leading producer, distributor, exporter, and retailer of beverages across the country. They used RPA and automated some 10 key processes with RPA. RPA tool is connected with Outlook, Excel, and the company's ERP system to access the data for various processes. [22]

Before the company was, implemented automation in enterprise the frequent, repetitive, and manual tasks were routinely affects the workdays of both employees and management. For example, purchase orders generation (POG) includes many levels of management staff depending on the amount, and each of these employees/ team leader would need to log in to the ERP system on their computer in multiple times a day to approve the PO with different levels.

The ABG Company has used RPA and made the POG process automatic by using RPA. The following tasks has made automated by using Softbot:

- By using Softbot, they can now **check for new POs when** created and **send an email** to the approver with the option an "Approve" and "Reject" button. Therefore, he/she can approve or reject literally with by the single click.
- **Update the ERP** with the approve/reject response and bot can submit automatically on SAP.
- **Keep status to track** the open POs and update the order generation.

Send reminders automatically to approvers who have not responded after a particular amount of period and check for any failed processes or rejection so that it can modify when need to change the amount.

Research approach:

The implementation of RPA in any industry demands extensive literature survey and review the past researches (Harrast S. A. [23]). RPA technology can also be used in smaller organization; therefore, it is necessary to investigate the impacts of change management within organization. Since the practical importance of this study was to increase the deep insights of the implementation of RPA in smaller organizations and, exposes what effects it has on its management. Therefore, it was necessary to choose the study based on inductive approach. Whereas a deductive research strategy focuses on developing hypotheses and theories before the collection of data and then, through its observations, confirm or deny the hypotheses developed. While an inductive research, strategy collects data from various fields to later identify patterns and build theories for thesis development (Bryman A. [24]).

Data collection:

The researcher performed in-person interviews to gather information for the study. Four individuals were chosen by the researcher since they are all knowledgeable about IT infrastructure and RPA automation development. FMCG is the business chosen for RPA implementation. As a result, the interviewers are also knowledgeable about sales, inventory management, and production.

This FMCG Company specializes in the production and processing of milk products. RPA can therefore be used to automate a variety of difficult tasks.

Semi-structured face-to-face interviews with participants in the manufacturing operations and site visits by the researchers were used to obtain primary data (Alshenqeeti [25]). The general site state, including inventory levels, the presence of systems, and general site conditions, were observed. The researchers' presence at the site did not typically have an impact on these observations. Key performance indicators (KPIs) records were included in secondary data, which were collected from participating companies. The KPIs comprised inventory levels, forecast accuracy, and production line efficiency.

The initial goals of the interviews were to get input from experts on effective RPA execution, risk variables that are important to aid with deficiencies, and common elements for RPA design review. The blueprinting of the interview's framework to cover all relevant components took a lot of effort. It is vital to examine the literature on RPA and implementation methodology in order to prepare for the question bank and interview framework. Additionally, it included participation in a successful RPA application for an FMCG company as well as instruction in robots software. Following the development phase, RPA deployment comprised five key stages. The interview consisted of questions pertaining to

these stages, a brief description of what occurs at each level, what is crucial for success at each stage, and what can happen if it fails. Two phases were created from the stages; phase I had three stages and phase II had two. These are the phases: Process evaluation, business case, proof of concept, project design and build, and RPA lifecycle are all included.

Data Analysis:

There was no need to transcribe or reformat the data from the interviewees' portion because their memos were already in the correct format to start the analysis. The data had to be coded, per the first phase, in order to be analysed. Coding entails taking the data and extracting ideas and meaning from it (Corbin & Strauss [26]). Initially, the codes just covered the project's phases and broad CSFs. As the coding went on, more of these categories were added as a pattern started to emerge. After coding, the data patches were also sorted according to the assigned labels. Ultimately, each design phase's remarks were added together in order to create a more comprehensive, understandable picture of what had actually occurred during that phase.

After that, analysis of the data by project phases was done using the grouped data. Then, the contents of the book were compared to the solutions from the test case study to determine the correct outcome. To paint a complete picture of what each stage in the design contains, the significances of each stage were represented. The study advanced to include the overarching CSFs after reaching saturation with it and having a typical understanding of the project lifecycle. Additionally, the acquired data was used to define and clarify each CSF's function in the test case, and this part was contrasted with that of the available research and hypothesis. Additionally, the success of the case design was evaluated; this time, the data was filtered and classified according to project success classes. This study was required to determine whether the design was successful or not because failure to do so would negatively impact following analyses.

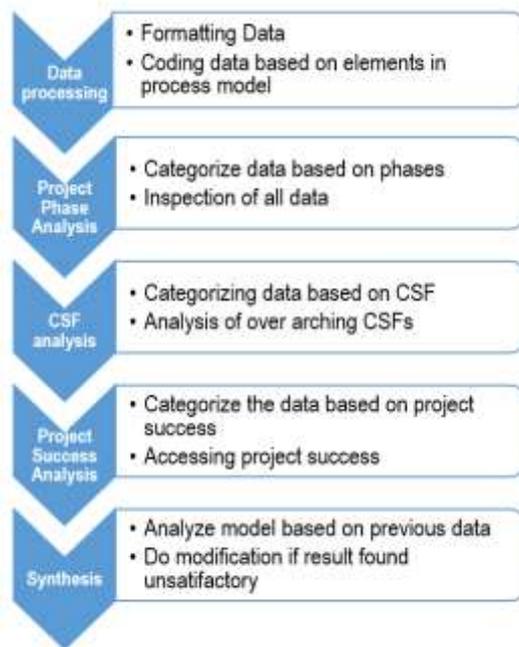


Figure 7: The analysis process summarized

Validity and reliability of research:

Validity is defined as the degree to which a methodology can accurately reflect what the system is really designed to measure [24]. As a result, it is difficult to assess validity using a quantitative technique in qualitative research. However, the quantitative exploration's statistical guarantees and confidence intervals give the researcher a chance [26]. Additionally, validity in qualitative research is related to how well-suited the technique selection is in connection to the ability to adequately address the research issue [24]. A crucial strategy for the technique choice was adopted in order to uphold the validity of this research. The author has provided insight into the process of selecting the investigation tactics for this study in the aforementioned subsections and has supported the selections. The system described in this part offers a way to respond to the research questions and uphold the validity of this investigation. The goal of this investigation is to examine the prospects and how they have changed following the implementation of RPA at the case company. The definition of reliability is whether the findings of a research study are consistent if an equivalent (i.e., different) exploratory study were to be carried out again. Therefore, it is crucial to validate the case study's approaches and methodologies in order to provide a test of the case study's reliability and allow the working investigator to repeat the

inquiry [24]. Therefore, when reporting investigation, the methodological portion of a study is an essential component. This study looks into the expectations for the use of a particular modern technology. The results of this research might not be sufficient to handle future technological advancements and their accomplishments given how quickly technology is developing now. However, given that this research examines the use of the technology known as RPA and that the features of RPA are provided, it is important to put the implementation into practice right away. Therefore, reliability covers a wide range in this study.

Ethical consideration:

This study has been conducted in accordance with the basic ethical principles that apply to standard research. These ethical principles consisting of requirements of voluntariness, positive approach, keep secret things and keep private the name for the persons involved in the study. So that it is possible to maintain the confidential data or part of data and how it can further utilized for assessment purpose. [25]. In order to fulfil these requirements, all respondents were sent written information regarding the research objectives and the usage of data prior to the data collection. Before conducting the interview there were taken the consent from interviewee and informed about the approach for interview to take participation on voluntarily basis.

These ethical principles involve necessities of voluntariness, integrity, confidentiality and obscurity for the persons included in the research, which can be more fluently described as essentials for information, authorization, confidentiality and use. In order to accomplish these necessities, all responders were transferred written information considering the exploration purposes and the application of data former to the data collection. The interviewees were also given information about the technique of the interviews and that the participation was based on a precisely voluntary base, conveying the participators sufficient information to evaluate whether or not they wanted to share in the study before giving their permission.

IV. FINDINGS

There are two phases of the project.

Project phases (Phase -I)

Taking interviews in a methodical way will serve as the topic of discussion for the first phase of RPA implementation. This includes determining the nature of the business problem, as well as the hurdles, problems, and tasks that call for increased effort. After a problem has been recognised, the business will make an effort to resolve it with the help of RPA. Therefore, interviewee 1 places a strong emphasis on identifying corporate issues:

Interviewee 1: "You have to identify what business problem is, before decide that RPA is the only solution to your problem."

When a company has made the decision that RPA is the appropriate method to solve an issue, the next step is for that business to identify which RPA software is the greatest fit for the specific problem.

Process Assessment and evaluation:

Before RPA is selected as the solution to the problem, it is necessary to do an analysis of the business process in order to construct a successful business plan. According to what Interviewee 2 had to say about the function of process evaluation and its dependence on:

Interviewee 2: "Before implement RPA, process evaluation is essential to check whether it is give payback for automating it or not. So, it is based on the evaluation and assessment of selected process"

Wrong processes chosen for RPA

The selection of a reliable process is one of the most important factors in the effective implementation of RPA. To achieve this, it is necessary to choose the method that is most suitable. It is necessary to carry out a process assessment in order to identify the most qualified process-by-process analyst who is also extremely familiar with RPA. Interviewee 1 and interviewee 3 discuss the significance of process selection for PoC in their responses. Despite this, there is a possibility that the incorrect process was chosen by accident:

Interviewee 2: "Any process that select by customer himself without consulting will lead to failure the system."

Interviewees 1 and 2 had a conversation on the criteria that should be used to pick a proper process analyst. It is the responsibility of a qualified process analyst to ensure that all employees comprehend RPA in conjunction with the necessary criteria. For example, combining RPA with other tools and applications so that the entire process may be automated rather than just a portion of it at a time would accomplish this. Interviewee 4 given description:

Interviewee 4: "You could have one process that fetch the data from one system and given to another one. At this time, there could be another process where another person goes to a webpage or website and extract numbers that is same which you have already received. That is why you need clear understanding of RPA for its assessment."

Every person who was interviewed emphasised how important it is to avoid picking proof-of-concept approaches that are overly complicated. If it does not occur, the company is at risk of failing. Respondent 2 explained why straightforward and straightforward procedures had to be chosen for PoC:

Interviewee 2: "You should always start with easy processes for first implementation of project. Moreover, build objects or flowcharts because then you can reuse it for further design."

The second interviewee brought up the point that the amount of automation that may be achieved in Phase II is contingent on the level of the developer's experience. It is recommended that the processes with the greatest satisfied value be chosen for Phase II; however, if the developers have less experience, it is recommended that they begin with the easier processes and then choose the more complex ones later.

Proof of Concept:

Proof of concept (PoC) demonstrates both effective and ineffective ways to practise RPA process implementation (Hindle et al. [27]). The RPA tool's suitability is evaluated through the usage of a proof of concept (PoC). If the product is found to be defective during testing, the cost of fixing it ought to be borne by the organisation. After the process has been developed, it needs to be readied so that it can be tested for dependability considerations of the project. (Kumar B A [28]).

Proof-of-concept work for robotic process automation (RPA) isn't just about improving technology; it's also about finding solutions to business problems. Respondent 2 of the interviews explained that the attention that is needed to be focused on the operational model using ERP. The first respondent to the interview indicated how the Proof of Concept (PoC) should be the primary emphasis for early process review in the business.

Interviewee 1: "Here it necessary to give primary focus on RPA process development needs. PoC is working for all the automation developments."

The recommended length of time for a proof-of-concept (PoC) project ranged from seven to ten weeks, depending on the amount of time needed for implementation in order to evaluate the procedures in a production setting. After evaluating numerous different processes, interviewees 3 and 4 came to the conclusion that just one of the processes should be automated in the Proof of Concept. This testing took place in the Production environment.

Lack of Knowledge to understand the RPA requirements:

According to Interviewee 1, it is essential to ensure that the business is aware of what RPA is and is able to comprehend the prerequisites for doing so in order to comprehend the requirements of RPA. According to respondent number 2, a PoC project only needs one team, but this number can vary depending on the project's primary objective. Take, for instance, the objective of providing RPA training to employees of the company; in this case, the organisation will need someone who has significant experience as well as knowledge in the area of RPA and, as a result, should be able to teach employees of the firm.

Interviewee 2: "Organization has required the person who is dedicated to the operating model of process, strategy, and having knowledge of process assessment."

Phase (Phase-II)

Phase II only going further if the PoC satisfy the business needs and find the scope for other processes to make automatable.
RPA without an Operating Model:

All interviewees in Phase-I discussed the importance of building a structure for RPA implementation in a company. RPA without any organization structure may become failure. The significance of RPA structure increases when the number of automated processes increase:

Interviewee 3: "There are required experienced person in company. Who can close working with robots? To maintain RPA is difficult when the number of automated processes that are running simultaneously in production environment increases gradually. Without him many things can go wrong."

Interviewee 3 talked that there is one experienced person is required for robots maintenance. Interviewee 2 described to link RPA to the company the system where it is desired.

Interviewee 2: "After designing the RPA structure, where we have to put RPA either for multiple places or only single location. Many countries there is CoE that supports all the teams in organization."

All interviewees discussed there are one experience project manager, one process owner, developer is necessary.

RPA without Change Management:

Interviewee 4 indicated that there was some fear among workers about the possibility of a robot taking their jobs. It is possible that employees will not be interested in participating in the project if they are concerned about losing their employment. Therefore, change management is required whenever there is an increase in the number of procedures that are automated. The second interviewee emphasised the significance of having a member of the staff who is responsible for change management in the firm:

Interviewee 2: "If responsibility is up to management body, then one should have to taking care of operation level activities. However, no one linking with both level, so the operation level must be centralized in building robots but if any change management occurs, so there must be someone that is responsible for both level activities."

Insufficient knowledge to developer:

Interviewee 2 told that the process might go wrong in development if developers do not have enough knowledge of RPA development as a good developer, so for that he described factors that can lead to a wrong development:

Interviewee 2: "If there are error in flowchart execution and robot is unable to display the message, and also it should not have decision making capability what to right then robot can give wrong result."

V. CONCLUSION

The study was exploratory to evaluate RPA implementation expectations in an unstudied location. The project used RPA and Change Management research to new areas. This report explains how to use RPA in FMCG to boost company growth. It encompasses material purchasing, store inventory management, final product audit, supply chain system, and customer assistance. This study didn't develop any new hypothesis. This research has uncovered new areas of applicability, building on prior hypotheses and highlighting hitherto unexplored elements.

The study's conclusions indicate there are opportunities to apply Change Management models to deal with differences in expectations and how to deal with them to promote continued automation within a smaller organization, whether it's manufacturing goods or customer interactive support management system.

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