A study on factors driving effectiveness of Robotic Automation and Business Processes Management

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Abstract

This research paper is aimed to conduct a qualitative study to understand the factors which effect the robotic process automation and business process management. The research was conducted in two phases – understanding the factors through literary sources and then aligning the findings to the case study which is experiential based. The findings of the research study revealed two sets of variables, the independent and dependent variables. The independent variables impact and drive dependent variables which are activities of business process management. The study also revealed that business process management is the key enabler in effective implementation of robotic process automation project/program. The study finally gives the model which can help to manifest various factors (variables) that would enable the effectiveness. It also defines the relationships between each variable and related hypothesis for future testing for reliability.

*Keywords***:** Artificial intelligence (AI), Business Process Management (BPA), Robotic Process Automation (RPA)

1. Introduction

The structured approach to improve processes of any organization is to use Business process management (BPM) to get work done. The BPM serves the customer need to build a right solution and generate business value. A business process as suggested by Linda (Tucci, 2017), is an activity or set of activities that helps accomplish an organization's goals, such as increasing profits or promoting workforce diversity. The goal is to improve a business process of an organisation, by analysing and modelling new process using Robotic Process Automation (RPA) and Digital Workforce. It helps to improve efficiency and quality output which leads to higher customer satisfaction due to reduced time of manual processing. The objective of this study is to find the hypothesis which defines the relationships between various independent variables and dependent variables of effective RPA implementation and aligned business processes.

2.   Research Methodology:

The researchers carried out Qualitative Research technique (Gratton, 2004, pp. 22–106) to capture the theoretical base of the study. The secondary data was selected from various sources from the digital world and a single experience-based longitudinal case study (Dul & Hak, 2022/2015, pp. 112–210), was selected from experience of the researchers in RPA implementation project. The researchers already have experiences in Robotic Process Automation projects, so it was easy to pick up the best suited case study as part of sampling method (Gratton, 2004, pp. 103). To meet the objective of the research i.e., to come out with a conceptual model and associated hypothesis the researchers followed the steps (Dul & Hak, 2022/2015b, p. 223) as below.
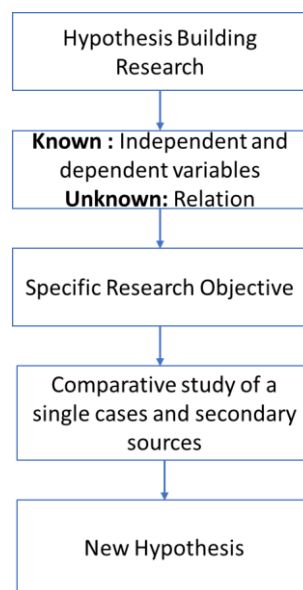
Source: Authors adopted - Hypothesis building practice-oriented research (Dul & Hak, 2022/2015b, p. 223)

Figure1: Conceptual model

3. Literature Review

### [A] Project Specific Case Study:

The researchers have empirically worked on few robotic process automation implementation projects and the case study below provides an insight of the factors that enables successful implementation. The word 'Automation' appearing in this paper represents each kind, including Robotic Process Automation (RPA).

Problem statement - UK Telecom giant wanted help to increase the capacity of their existing back-office workforce placing orders for their enterprise customers due to high volume service requests coming to the contact centre advisors/sales team.

Automation feasibility study and need Analysis Approach - Before the requirement gathering started, automation feasibility study and need analysis was performed to gain benefits through various activities as mentioned below:

a) Understand the back-office workstack

b) Understand present processes in practice

c) Understand process specific pain points

d) Do Time and Motion Study

e) Perform volumetric analysis

f) Identify the automation benefits per process

g) Identify main and associated automation high level requirements

h) Identify the technologies suitable for automation

i) Perform process complexity analysis

j) Calculate the cost to benefit ratio / Return on Investment (ROI)

k) Evaluate processes for automation feasibility

l) Prioritize the automation process

The below swim lane diagram gives the summarisation of automation business flow. It also highlights the BPM role in the entire automation journey.
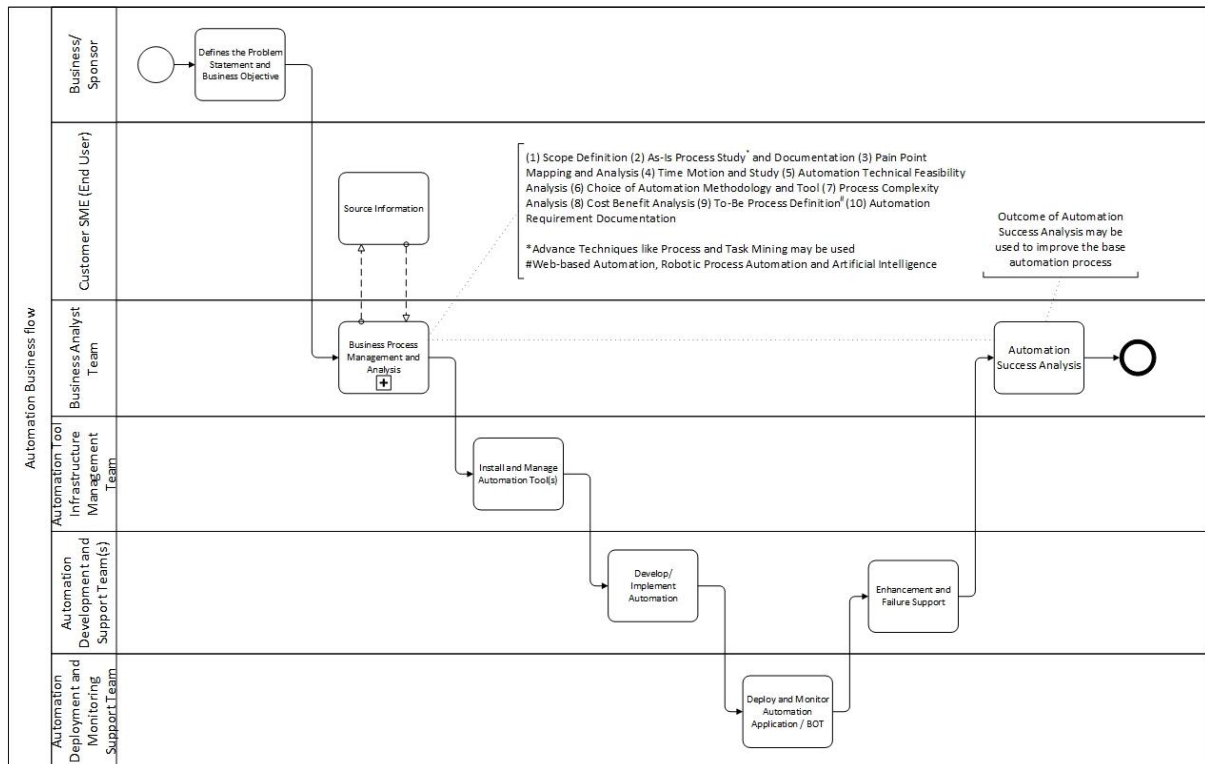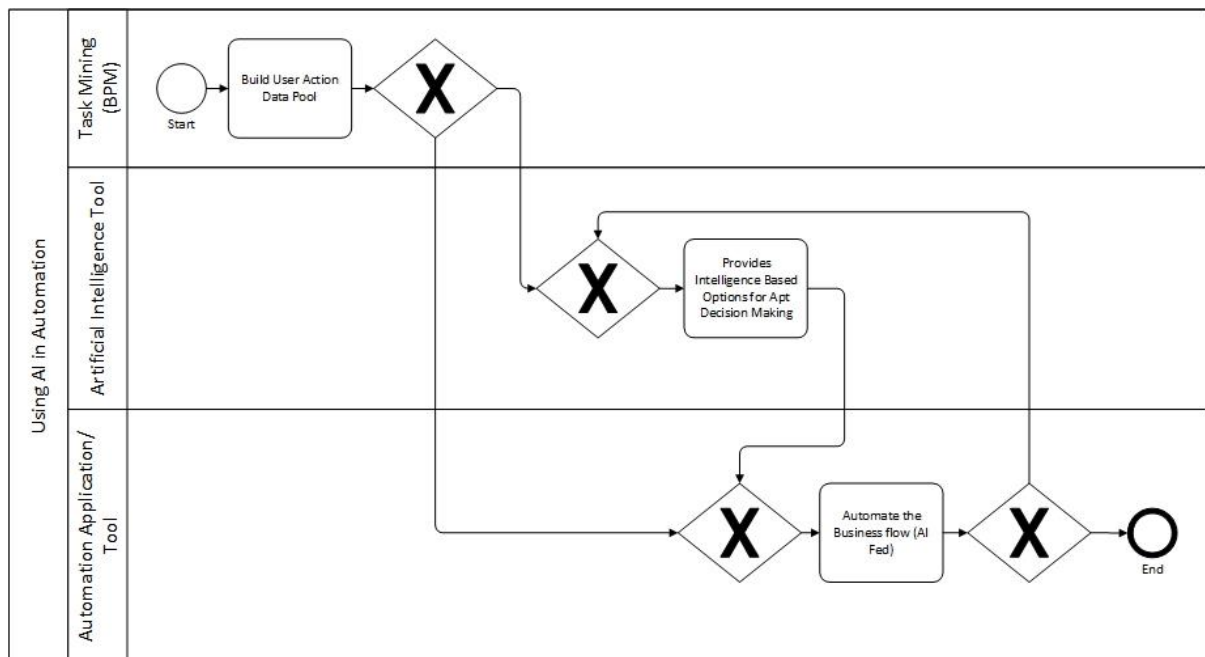
Source:Authors

Figure 2: Summarisation of automation business flow

The outcome of 'Automation Success Analysis', may be used to improve the base automation process.

The Business Process Management (BPM) team, with rich experience in digital transformation and automation programs was invited to drive and perform the mentioned tasks accurately and diligently. The back-office teams had the Standard Operating Procedures for the operational processes however those were insufficient to capture the detailed steps of both the happy and unhappy path scenarios. Usually that is most likely the case, in such automation programs. That is why it is very important to identify right set of stakeholders/ SMEs with high availability and having required knowledge of the business domain.

During the discussions with the SMEs, the Business Analysts (BA) uncovered all major scenarios and documented the As-Is processes. The processes where the subject matter experts (SME's) availability was less, task mining was implemented to identify the As-Is Process, additionally it also provided information about frequently followed steps, bottleneck tasks consuming more time, workarounds / smart work etc. The project team plans to implement task mining inputs (data) to drive AI based solution which would help in predictive action. Robotic process automation will then consume it for driving the complex touchpoint automation. The diagram below explains how AI based solution can be plugged into automation landscape.

Source: Authors

Figure 3: AI based solution can be plugged into automation landscape.

BA must be multifaceted personality; understanding the system stack, automation tools and technology, their advantages or unique selling point and shortfalls, their application, re-usability, extensibility, and cost of implementation plays a very important role in defining the futuristic solution. The To-Be processes defined by BA covered all these aspects along with the monitoring and reporting. The automation solution considered automation at different stages of the End-to-End ordering journey using an apt blend of Robotic Process Automation (tool mandated- 'Blueprism'), macros and integration with the workflow management tool (using Web-Services) for end-to-end monitoring, and reporting of the success and exception scenarios.

The development team did an excellent job of implementing the automation code directly in Production Environment with testing using live orders by running the BOT in attended mode initially.

[B] Literary Source *(secondary data):*the literary source gave an insight of factors those are important for driving the effectiveness of robotic process automation and business process management. These are as indicated below.

[B-1] Knowledge: Knowledge sharing is key to ensuring the smooth flow of business when introducing new processes and tools (getguru.com, 2020). In Telecom industry the knowledge factor plays a very important part in the todays Volatility, Uncertainty, Complexity and Ambiguity (VUCA) world. For any organization it is very crucial to keep track of new changes, understanding of the existing processes and issues, having controlled systems, and making sure proper information is provided. There are many options to retain knowledge in an organization like, up to date documentation, knowledge management process and tools, domain specific knowledge repositories and most importantly people working in the organization are key factors. For BPM projects very important factor is having right stakeholder who have knowledge of the working system and in-depth understanding of the manual process. At the same time project will need people who have knowledge on the tools and can implement those processes as a part of robotic automation. This will accelerate the project execution and it will be right first-time delivery.

[B-2] Skills and Experience: When it comes to the skills required for the successful robotic process automation of the business processes, project should have mix of competencies. When we select stakeholder for the business process from customer team, they should have vast experience in the domain, business awareness, customer priorities, problem solving, decision making and application knowledge. On the other side of the project are BPM and technical team, who should have practiced on aligning process to organizations vision, customer requirements, deep study on pain points, process discovery, design, development, and deployment. Here technical team is expected to be highly professional and experienced in the domain as well as RPA tools. Gartner has identified 15 critical skills for success of any BPM project. All skills are grouped under three categories – Transformation, Operational and Technical (Goasduff, 2014). To accelerate work to the right path, project must have skilled stakeholders and having the right skills for the project execution will lead to complete the project in the given timeline.

[B-3] Workload and Reusability: Availability of stakeholders is very important factor to complete all stages of the project in defined timelines. The stakeholders, especially the customer SMEs also have additional responsibilities and can dedicate time based on their workload. This may severely impact the quality of information gathering and the project timelines. The advances in BPM methodologies mitigate the above risks via implementation of Process and Task Mining based process discoveries and solutions based on the domain process knowledge repositories which are result of many such past implementation experiences. The BPM also focuses on process modularisation and independent automation units which can be reused at many places.

[B-4] Budget influences right resourcing and tool selection - As per the findings from research paper published by Holzmann, Vered; Panizel, Ilanit (Holzmann, 2013), the communications between the project team or scrum team (in an agile project), must be clear and well planned for engaging various stakeholders who are key to the project. Budget allocation is one of the keys to success of any BPM and RPA implementation and as highlighted by (Jaselskis & Ashley, 1991) in their technical research paper, the optimal utilization of budget allocated would help to select right resources and onboard on time. (Jaselskis & Ashley, 1991) Budget also helps to manifest that the team turnover reduction has a great influence on retention of knowledge and achieve better schedule or overall project performance. In yet another research conducted by (Lok & Doolin, 2021), 25% issues found in RPA implementation projects are due to tool selection and is corelated to budget. However, as recommended by 10xDS.com (10xDS, 2019), vendor fees, respective license

fees, cost of implementation, maintenance are imperative when selecting the right tool, however special indicators are tool effectiveness.

[B-5] Process Design influencing Automation Solution – Arindam Das conducted a research to derive how robotics process automation can be deployed with right business processes identification (Das &Dey, 2019). It was revealed that improve data yield from processes scored 4.29, right reporting and analytics solutioning scored 4.33 and solution built for higher flexibility scored 4.21 when analyzed across projects. Gartner published an article on process mining, suggesting that it discovers, monitors, and improves actual processes (that is, not assumed processes) by extracting knowledge from events, traces, messages left by applications, systems, and technology (Gartner, 2022).

[B-6] System Stack and the Automation Solution - The Systems Engineering Handbook of NASA (Shea, 2017) highlights that, 'The depth of the design effort should be sufficient to allow analytical verification of the design to the requirements. The design should be feasible and credible when judged by a knowledgeable independent review team and should have sufficient depth to support cost modelling and operational assessment'. As suggested by Alan McSweeny the RPA implementation team need to ensure that the RPA solutions are designed within a strategic model (McSweeney, 2021). This would avoid being impractical and unrealistic, building a short-term tactical solutions and approaches which would lead to accumulation of technical debt. Automation requirements are result of certain limitations of the existing application/ system stack which were not envisioned or had importance when the system was built. RPA solutions help in overcoming these limitations with tactical solutions in place.

[B-7] Webservices, API and the Automation Solution - As suggested by UIPath, one of the leading RPA tool providers, there is a difference in the way RPA and APIs process that is from front-end and back-end respectively. RPA and API automation technologies are often useful in conjunction (UiPath Inc, 2017). It is recommended by UIPath that APIs are used alongside front-end interfaces through end-to-end RPA automation. There are multiple API connectors such as 'drag-and-drop activities' are available, users can use to build RPA workflows. This enables and effective RPA solution design for the organization. Web services based RPA solutions may deliver more business benefits by reducing the cycle time.

[B-8] Benefits Realization – Lisley Willcock, a professor of technology, highlighted in her study across 16 cases, that benefits from Robotic Process automation can span between 30% to 200% with a long-term savings and in short term it is just labor level savings for an organization (Willcock, 2017). Lisley in her work also highlighted that there is a massive

scale of increase in data and the employees working on the transaction volume also increased over years and it is exponentially going to increase for years to come and hence employees are also benefited in long run through implementation of RPA (Willcock, 2017). Apart from giving direct/ tangible monetary benefits, right RPA solution also provides other indirect/ intangible benefits by simplifying the processes end-to-end, removing bottlenecks and side-effects of the subject automation processes with improved Net Promoter Score (NPS).

4. Findings and Discussion:

Based on the literary source and project specific case study, it can be encapsulated that the following model can be drawn, which gives the relationship between set of independent variables and dependent variables. The dependent variables are critical stages of BPM process for RPA project implementation. The independent variables affect these dependent variables and thus forms a relationship.
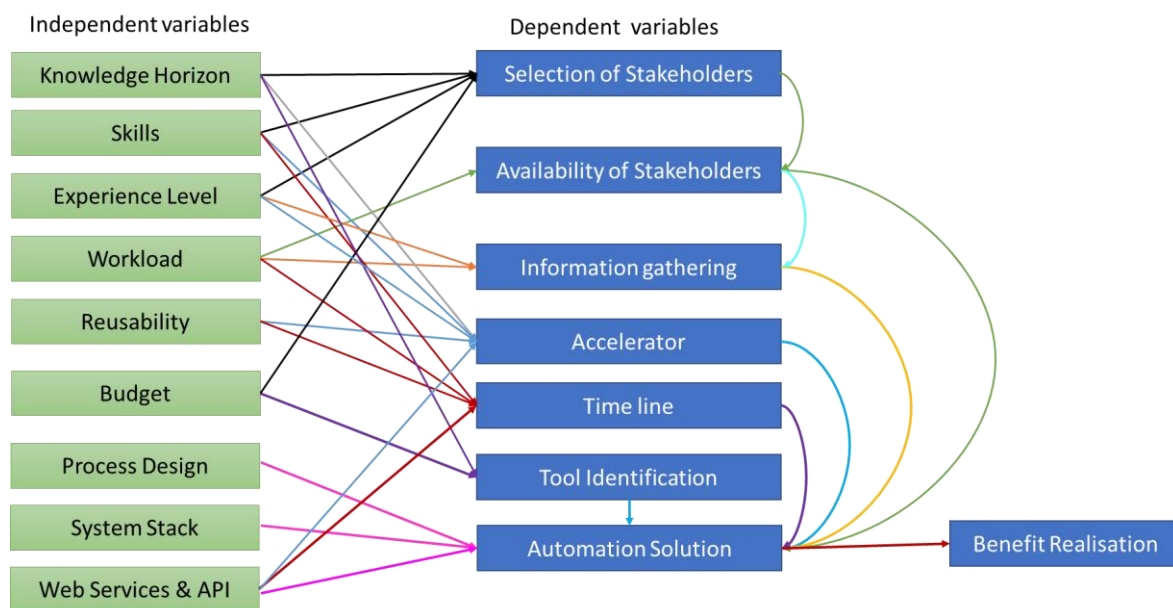

Source: Authors

Figure4: The relationship between the independent variables and dependent variables can be manifested as below in form of Hypothesis.

[H0(1)] Scale of Knowledge, Level of Skills, Experience Level, Budget will determine the right selection of stakeholders.
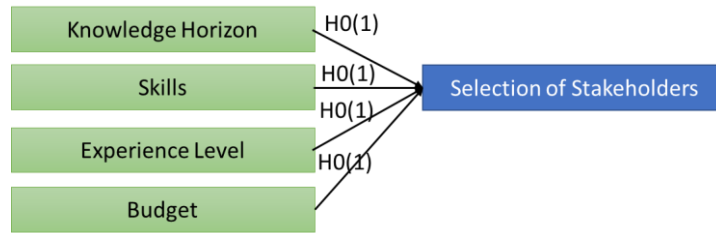
[H0(2)] Workload of stakeholder though right stakeholder is selected would influence availability of stakeholders.
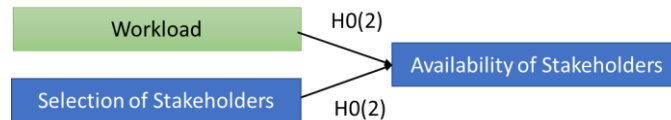

[H0(3)] Quality of Information gathering is dependent upon Level of experience, workload of stakeholders and Availability of Stakeholders
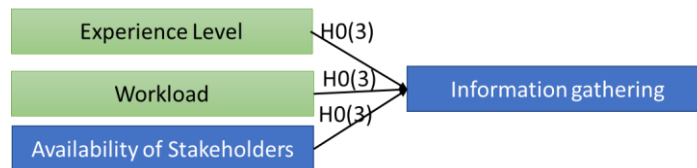

[H0(4)] Knowledge Horizon, Skill level, experience level, re usability and use of web services & API would accelerate the deliveries of project or program.
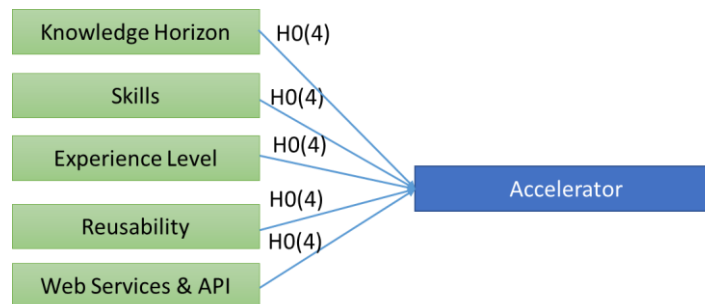

[H0(5)] Skill level, amount of workload, reusability and use of web services & API has an impact on project or program Timeline.
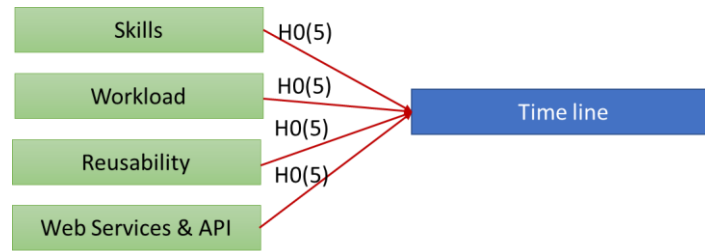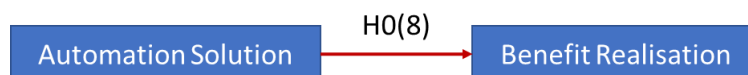
[H0(6)] Budget and Knowledge Horizon drive the Tool identification for use in the project or program
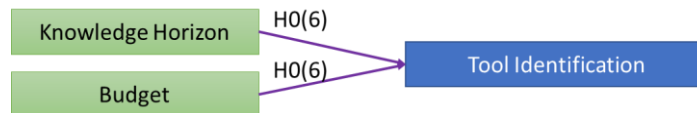
[H0(7)] Automation solution is driven by right process design, system stack, web services & API, tool identification, timelines, accelerator, availability of stakeholders and information gathering
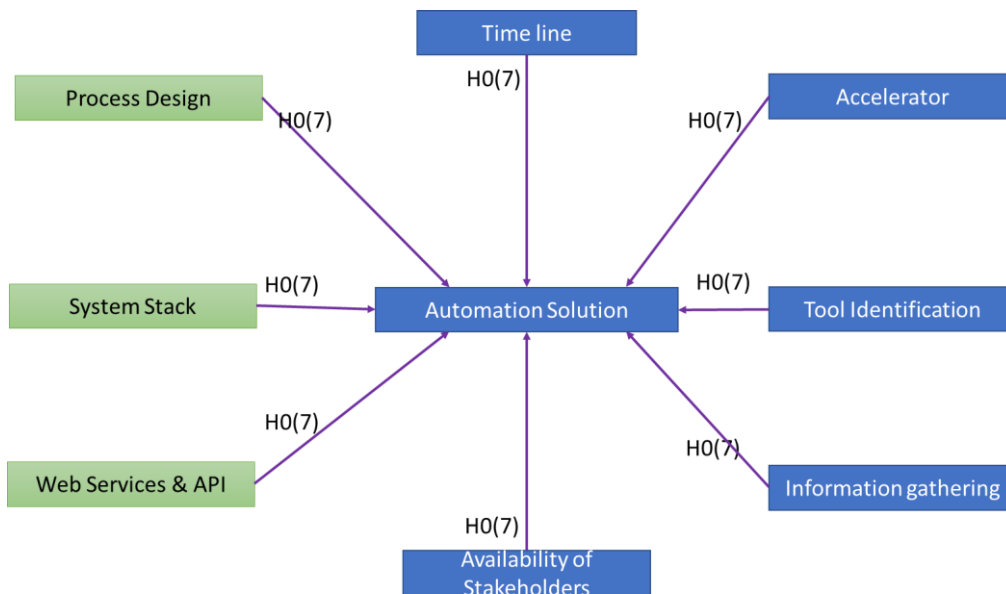
[H0(8)] Right solution drives benefit realization

5. Limitation and Future Scope of Study:

The model created as part of findings and study, is conceptually created however this requires to be tested empirically with right hypothesis testing. The model needs to be tested across other projects and all the identified hypothesis needs to be tested on similar case studies.

6. Conclusion

The research work of experience based longitudinal case study and literature reviews from secondary sources, reveals the important factors and their interrelations, which contribute to effectiveness and success of the Automation (including RPA) programs. Business Process Management (BPM) is the main faculty and connecting bridge which helps to translate and realize the 'Automation Objectives' of the Business. BPM uncovers the As-Is process gaps, identifies the automation areas, evaluates the business benefits, and defines effective AI based Automation solutions. As an outcome of the research study, the researchers have formulated a model along with hypothesis and reliability testing.

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