Robotics Process Automation: Customer Contact Centre Email Management Utilising UiPath

by

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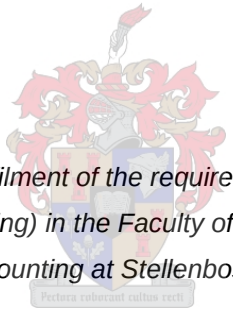

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Declaration

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Abstract

Customer contact centres have become at the forefront because of inevitable technological advancements, making many customers prefer to access services from the comfort of their own homes over travelling to do the work. The result has burdened contact centres with calls and emails that pile up and cause backlogs that are more difficult to manage with continuous inflow, as well as pressures to attract customers, sell services and products and provide the best customer experience in the process of retaining clients.

This study considers the Robotics Process Automation (RPA) software implementation governance through the establishment of the framework with a clear cascade of governance on technological solutions adopted by organisations. The approaches considered for this study range from an Information Technology (IT) perspective to RPA application software, informed by governance standards and control frameworks adopted. Employing RPA technology, the study tackles challenges facing governance, including initiative-taking steps that warrant implementation of measures to ensure regulatory compliance, scalability, and auditability. The administration and deployment of RPA technology entails a complex network of relationships with various stakeholders, each of which has functions and interests, structures, and direction, thus necessitating comprehensive guidance. The desirable structures and directions were attained through an integrated RPA governance framework using the constructed RPA UiPath application software.

RPA implementations and usage have been established to address the customer contact centre challenges with UiPath application software. According to the literature studied, UiPath is a leader in automation, providing solutions for harvesting processes, assuring process efficiency, and effectiveness. UiPath does not require programming capabilities, which is advantageous for resources management. UiPath major offering, Studio, and its elements, along with innovative technologies, have demonstrated that organizations' strategic objectives may be realized with their diverse robot offerings. Because of UiPath's unattended and hybrid robots, resources can be deployed to different roles, risk on daily duties can be mitigated through controlled access that UiPath robots are given, ensuring that they complete tasks that they are configured to do, and deliver around-the-clock service because robots do not tire.

The systematic literature review technique, including a design science research strategy, have been used to categorise, identify, and separate contributors of a complete RPA governance framework in the context of customer contact centre email management from relevant literature. Also considered are the procedures required to create an adaptable, useable framework that mitigates RPA technology governance constraints.

The rewards of an adaptable framework were discovered to be enabled by a well-defined implementation plan and appropriate alignment between business and IT operations, informed by Control Objectives for Information Technology (COBIT 19) and ISO/IEC 38500:2015 as governance standards. Because RPA technology requires no new infrastructure, though running on legacy systems managed by IT, and the technology's end-users are business operations personnel, clearly defined

work processes, roles, and duties, need to be established and followed from the time RPA UiPath application software is acquired until it is decommissioned to ensure conformity by the whole organisation.

Opsomming

Kliëntekontaksentrums het op die voorgrond getree as gevolg van vooraanstaande onvermydelike tegnologiese vooruitgang, wat die meerderheid individue dryf wat kliënte verkies om toegang tot dienste vanuit die gemak van hul eie huise te verkry eerder as om te reis om dit te doen. Die resultaat het kontaksentrums belas met oproepe en e-posse wat ophoop en agterstande veroorsaak wat moeiliker is om te bestuur met voortdurende invloei, sowel as druk om kliënte te lok, dienste, produkte te verkoop en die beste klantervaring in die proses te bied om te behou kliënte.

Hierdie studie-analise oorweeg die Robotics Process Automation (RPA)-sagteware-implementeringsbestuur deur die daarstelling van 'n raamwerk, wat 'n duidelike kaskade van bestuur verskaf oor tegnologiese oplossings wat deur organisasies aanvaar word. Benaderings wat in hierdie verband oorweeg word, wissel van 'n Inligtingstegnologie (IT) perspektief tot RPA toepassingsagteware, ingelig deur bestuurstandaarde en beheerraamwerke wat aangeneem is. Wanneer RPA-tegnologie aangewend word, konfronteer dit struikelblokke in terme van bestuur; en sluit inisiatiefneemstappe in wat implementering van maatreëls regverdig om regulatoriese nakoming, skaalbaarheid en ouditbaarheid te verseker. Die administrasie en ontplooiing van RPA-tegnologie behels 'n komplekse netwerk van verhoudings met 'n verskeidenheid van belanghebbendes, elk met 'n eie stel funksies en belange, struktuur en rigting, daarom is dit nodig dat 'n basiese omvattende leiding verskaf word. Die gewenste struktuur en rigting is bereik met behulp van 'n geïntegreerde RPA-bestuursraamwerk wat gebruik maak van RPA UiPath toepassingsagteware wat gebou is.

RPA-implementerings en -gebruik is gevestig om die kliëntkontaksentrumuitdagings met UiPath-toepassingsagteware aan te spreek. Volgens die literatuur wat bestudeer is, is UiPath 'n leier in outomatisering, wat oplossings vir oesprosesse verskaf, prosesdoeltreffendheid en doeltreffendheid verseker. UiPath vereis nie programmeringsvermoëns nie, wat voordelig is vir hulpbronbestuur. UiPath groot aanbieding, Studio, en sy elemente, tesame met innoverende tegnologieë, het getoon dat organisasies se strategiese doelwitte verwesenlik kan word met hul diverse robotaanbiedings. As gevolg van UiPath se onbewaakte en hibriede robotte, kan hulpbronne na verskillende rolle ontplooi word, risiko op daaglikse pligte kan versag word deur beheerde toegang wat UiPath-robotte kry, om te verseker dat hulle take voltooi waarvoor hulle gekonfigureer is om te doen, en rondom die- klokdiens omdat robotte nie moeg word nie.

Die sistematiese literatuuroorsigtegniek, in samewerking met 'n ontwerpwetenskapnavorsingstrategie, is gebruik om bydraers van 'n volledige RPA-bestuursraamwerk te kategoriseer, te identifiseer en te skei in die konteks van kliëntkontaksentrum-e-posbestuur vanuit relevante literatuur. Dit is gedoen terwyl ook die prosedures oorweeg is wat nodig is om 'n aanpasbare, bruikbare raamwerk te skep wat RPA-tegnologiebestuursbeperkings versag.

Daar is ontdek dat die belonings van 'n aanpasbare raamwerk moontlik gemaak word deur 'n goed gedefinieerde implementeringsplan en toepaslike belyning tussen besigheid en IT-bedrywighede, ingelig deur Beheerdoelwitte vir Inligtingstegnologie (COBIT 19) en ISO/IEC 38500:2015 as bestuurstandaarde. Omdat RPA-tegnologie nie nuwe infrastruktuur benodig nie en loop op huidige stelsels wat deur IT bestuur word, en die tegnologie se gebruikers besigheidsbedrywighede personeel is, moet duidelik gedefinieerde werkprosesse, rolle en pligte gevestig en gevolg word vanaf die tyd dat RPA UiPath aansoek gedoen word. sagteware word verkry totdat dit uit diens gestel word om ooreenstemming deur die hele organisasie te verseker.

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My Master of Commerce in Computer Auditing studies come to an end with the submission of my thesis. Studying at Stellenbosch University has been a delight, even though the pandemic came at the beginning of our studies, objectives were achieved exceptionally. I would like to thank my professors, Professor Rudman, and Professor Boshoff, from whom I have learned so much over the last two years.

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I dedicate my thesis to my family, coworkers, and friends; you have all supported and encouraged me tremendously during this degree.

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List of Abbreviations

Acronym	Description
AI	Artificial Intelligence
API	Application Programming Interface
Bot	Robot
BPM	Business Process Management
BPMS	Business Process Management Systems
CCC	Customer Contact Centre
COBIT	Control Objectives for Information Technology
CMMI	Capability Maturity Model Integrated
CoE	Centre of Excellence
CRM	Customer Relationship Management
COSO	Committee of Sponsoring Organizations of the Treadway Commission
Bcc/ Cc	Blind Carbon Copy/Carbon Copy
DL	Deep Learning
DR	Disaster Recovery
ETL	Extraction Transport Load
FTE	Full Time Employee
HTML	Hypertext Mark-up Language
HTTP/HTTPS	Hypertext Transfer Protocol Secure
IMAP/SMTP	Internet Message Access Protocol/ Simple Mail Transfer Protocol
IT	Information Technology
ITGI	Information Technology Governance Institute
ITIL	Information Technology Infrastructure Library
IS	Information Systems
ISO	International Standard Organisation

JSON	JavaScript Object Notation
KPI	Key Performance Indicators
MISS	Microsoft's Information Services Server (MISS)
ML	Machine Learning
POP3	Post Office Protocol 3
PDF	Portable Document Format
QA	Quality Assurance
RL	Reinforcement Learning
ROI	Return on Investment
RPA	Robotics Process Automation
SDLC	System Development Life Cycle
SQL	Structured Query Language
VCS	Version Control System
UAT	User Acceptance Testing
UI	User Interface
URL	Uniform Resource Locator
UX	User Experience

1 CHAPTER ONE

AN OVERVIEW OF THE STUDY

1.1 Introduction and Background

To foster innovation as a future source of competitiveness and corporate success, organisations engage in value creation rather than mundane tasks in the digital age (Moffitt, Rozario & Vasarhelyi, 2018:1). As a result, businesses are hesitant to engage in large-scale, expensive back-end integration projects, preferring instead to use adaptive technologies to automate their front-office processes (Moffitt, Rozario & Vasarhelyi, 2018:1). Robotic Process Automation (RPA) integrates robotics, stating software agents that function as human beings in a simulated environment that combines artificial intelligence with business process management to provide the opportunity for robots to work as a virtual workforce for automating duties (Moffitt, Rozario & Vasarhelyi, 2018:1).

Technology advancements, along with a desire to reduce corporate costs through automation, have resulted in a major increase in the use of RPA technology (Gartner, 2021). RPA is an innovative technology that comprises software agents known as "bots" that emulate a human's manual pathway through a variety of computer applications when doing certain activities in a business process (Kyheröinen, 2018:5). Such bots often conduct activities that are rule-based, well-structured and repetitious (Syed, Suriadi, Adams, Bandara, Leemans, Ouyang, ter Hofstede, van de Weerd, Wynn & Reijers, 2020:7). Therefore, organisations are attempting to increase the efficacy of their processes, reform and control their business processes to maintain competitiveness through such advancements as automation (Kyheröinen, 2018:5). Using automation, Information Technology (IT) plays a critical role in ensuring the fulfilled organisation’s imperatives (Kyheröinen, 2018:5).

Further, Kirchmer and Franz (2019:31) view digital revolution as having altered the way organisations work. New digital tools have become more widely available, thereby having the potential to considerably influence contemporary ways of work, specifically in the sphere of information technology. Such new digital tools help to modify company processes, thus making them more efficient, agile, and compliant, as well as improving customer experience and overall quality of deliverables. In addition, they assist in achieving a degree of process performance that was formerly unimaginable, one of such digital enablers is RPA (Kirchmer & Franz, 2019:31). Based on the findings of Matthies (2020:1), approximately 70% of administrative duties may be conducted by automation, offering a considerable increase in productivity and efficiency for recurrent, defined processes in providing customer service.

Customer service is critical in every organisation, involving better cost-saving services, coupled with less time and complaints (Muriithi, 2020:11). Organisations with a large customer base seek to provide superior customer service (Muriithi, 2020:11). However, there has been a struggle to provide the kind of services expected by clients. One of the most significant problems confronting major organisations with large client base in their customer service departments is finding acceptable number of people to

deal with customer enquiries (Muriithi, 2020:11). Continuing to hire additional employees does not completely alleviate the problem since there is limited number of employees to be supported by an organisation before its operating costs surpass its returns. RPA adoption allows for the formation of a digital workforce to supplement the human workforce accessible for customer facing services, alleviating the misapprehension of the organisation's failure to deliver services (Muriithi, 2020:11).

Organisations offer customers an opportunity to communicate with agents through Customer Contact Centres (CCCs), with communication mostly centred around email and phone calls to improve services (Mononen, 2020:9). In recent years, this mode has become one of the most popular methods of communicating between organisations and customers (Mononen, 2020:9). CCCs, on the other hand, confront operational issues such as agent inefficiency, high volumes of incoming requests and the avoidance of idleness. Incorporating RPA technology into the management of CCCs is crucial, as one distinguishing feature offered by RPA is robots that can serve multiple customers simultaneously with the help of chatbots provided by RPA software (Vishnu, Agochiya & Palkar, 2017:69). Queries requiring human intervention through decision-making can escalate, resulting in an effortless way of automating responses using chatbots through question-and-answer sessions (Vishnu, Agochiya & Palkar (2017:69). Back-office service requests, where information is received through emails and converted into a structured form for input in other systems, can easily be carried out by RPA robots, enhancing efficiency in CCCs (Wirtz, Kunz & Paluch, 2021:40).

A contact centre is a general term for a customer support that operates through the phone and other digital media in an organisation. It is made up of teams of individuals known as agents or customer service representatives that address service requests whilst sharing telecommunications and information technology infrastructure (Gans, Liu, Mandelbaum, Shen & Ye, 2010). Contact centre requests include service inquiries and adjustments to client information coming through emails and calls. Before providing services to clients, client information is validated, replicated in multiple systems, evaluated and confirmed with the consumer (Gans *et al.,* 2010). CCCs work in a variety of ways depending on differing industries, an example is the process of placing or updating an order. This frequently necessitates information being sought, collected, checked, sorted, filtered, formatted, input into multiple systems to place the order, stakeholders being alerted, approvals being confirmed, and the customer being updated after the transaction has been completed. These tasks are prohibitively expensive and time-consuming (Ramachandran, Hayes, Clark & Jenkač, 2020).

Customers, employees, and organisations have changed their situations and actions because of the COVID-19 pandemic which prompted an increased usage of CCCs that were already emburdened with back-logs (Ramachandran *et al.,* 2020). Leaders have been pushed to develop solutions to mitigate operational obstacles due to the severity and urgency of the crisis. The usage of virtual service channels and CCCs increased as physical stores and branches closed. Organisations that successfully maintained their CCCs operations through efficient strategic planning have made strides (Ramachandran *et al.,* 2020). Organisations have been considering how to leverage the forces of change generated by the crisis by taking an opportunity to encourage a long-term move to digitised automated self-service channels. Self-service automation for high-volume transactional enquiries like

describing product features and checking account balances would enable human resources for handling more complex and sensitive requests (Ramachandran *et al.,* 2020).

The services that are offered to customers impact on their degree of satisfaction, yet what one consumer considers quality may not be quality to another. Client service departments within organisations like CCCs do various tedious and monotonous duties, such as gathering customer profiles and providing feedback to consumers, to service customers through various communication methods including emails (Muriithi, 2020:11). With such repetitive and monotonous tasks in CCCs which do not require special expertise to complete, organisations should develop problem-solving initiatives to manage and control the tasks efficiently while also remaining competitive and having an edge in the market (Muriithi, 2020:11). RPA allows for the automation of repetitive processes while also lowering operating costs (Forrester, 2014). Because RPA robots can repeat the same procedure, the service quality enhances efficiency, with minimal errors (Lacity & Willcocks, 2018:270).

Besides maximising shareholder value, using intelligence tools and methodologies, automating organisational and business activities, RPA is crucial. RPA enhances the accuracy and implementation of RPA processes in extracting data, categorisation, classification, forecasting and process optimisation (Ribeiro, Lima, Eckhardt & Paiva, 2021:52). Lacity *et al*. (2015:24) highlight a variety of methods and practices for configuring robots to do desired activities, including recording workflows, using graphical interfaces with process flowcharts, and employing scripting language.

While diverse RPA software programs have been noted, this study examines the RPA tool UiPath, which can be used to assist in optimising the organisational processes in relation to the fourth industrial revolution in CCCs. Ribeiro *et al*. (2021:53) define UiPath application software as a "tool that allows the development of RPA functionalities in its framework to create and execute programming scripts, allowing it to be programmed with an interface of blocks and multiple plugins for business process customizations". UiPath Studio, UiPath Robot, and UiPath Orchestrator are the three components that make up the RPA UiPath platform, with the latter allowing for robot orchestration (UiPath, 2021f). The UiPath Studio feature is an instrument that enables organisations to develop, simulate and execute processes. The tool also assists in the establishment and management of robot connections; it ensures transfer of data packages and management of queues (Malathi *et al.,* 2021:1). UiPath robots run on an available infrastructure without requiring separate virtual machines, servers, handle management and control responsibilities. UiPath Studio offers different ways of structuring activities across a wide range of skills, offering employee-developed attended robots as well as unattended robots capable of large-scale processing. All these are controlled and managed by the UiPath platform (UiPath, 2021f).

As with all emerging and older technologies, implementation of RPA projects and application software should be tailored to regulatory laws governing system development life cycle of technologies, and/or to abide by any other related regulations. The IT management ought to acknowledge the importance of managing information security risk related to robots and formulate effective governance structures and methods of managing such risks (Willcocks *et al*., 2015:29). Because UiPath software relies on legacy IT infrastructure, its implementation should adhere to the existing system governance and risk appetite

(Ribeiro *et al.,* 2021:52). Co-ordination between business units and IT departments is critical in determining which processes and activities should be automated so that budgeting, development, implementation, and configuration management may be defined, resulting in an appropriate management life cycle for the establishment, administration, and continuing evolution of RPA. The data structure configuration and maintenance are both critical in enabling RPA implementation (Penttinen *et al.,* 2018:4).

This study compares email attendance by on-duty CCC agents against automated email attendance by robots. The vision has been to determine the most effective technique of working on customer emails to improve operational excellence and IT efficiency while adhering to IT governance rules. This study also seeks to outline the ways in which modern contact centres may use RPA offered by the UiPath application software package, to provide the best possible service to their consumers. Noting distinct types of emerging technologies, this study focuses on RPA utilisation of UiPath application package, RPA technology's implementation and IT governance, in relation to automation of management processes of CCCs emails.

1.2 Research Focus

The main attraction of RPA is its difference from existing IT solutions, particularly in terms of integration (Kyheröinen, 2018:2). According to Ivančić *et al*., (2019), RPA has been represented expediently and recognised in business practices as a lever for performance enhancement. Although many opportunities and drawbacks of RPA implementation have historically been addressed, there is a need to standardise experiences from business strategies related to the use of RPA, the adoption of UiPath application software, as well as the implementation of a governance framework merging both.

The aim of the study was to analyse the body of relevant publications in the RPA field, and ultimately design an RPA software implementation governance framework in the context of customer contact centres. The study also set out to understand the technology perspective of RPA and distinguish it from related technologies and manual interventions, to understand the usage of UiPath in the automation of email distribution and identification of their queue aging. Different manual processes of email attendance by the CCC staff have been considered. The study has thus focused on different elements or components from different technologies and applications to form a connected and comprehensible whole.

The software project governance of the RPA technology application (in this case, UiPath software) was found important for the successful discovery, implementation and distribution of software robots within organisations (Soybir & Schmidt, 2021:289). With scant research in the field of RPA to provide an adoptable governance structure that makes RPA software implementation easy, this study would help to fill the knowledge gap by providing an insight into RPA's implementation and governance through a detailed governance framework. As many RPA programs grow, so will the complexity and uncertainty. Therefore, having a blueprint to guide its implementation within different organisations is crucial. RPA robots, for example, have recently been popular, thus frequently featuring organisations at the scaling-

up stage and rendering a need for documenting a systematic methodology of implementation (Lacity & Willcocks, 2018:282).

RPA can be used in conjunction with machine learning and cognitive technologies, with possible improvement in the future. As a result, managing RPA within organisations may become even more difficult; a good governance framework can offer guidelines in management challenges and risks associated with RPA, necessitating a form of direction that can be modified. This direction may limit risks and oversee any impending complexities and ambiguities (Vishnu, Agochiya & Palkar, 2017:69). RPA governance is also required to insure secure and safe operations of installed robots and avoid regulatory violations. Without proper governance, software robots can be unreliable, costly, and onerous (Orynbayeva, 2020:2). For the progress of software bots, governance is crucial. RPA's operational governance provides an opportunity for information technology to develop new understanding and forecasts, as there is a need to address this issue, which not only affects the present, but which also influences the future (Orynbayeva, 2020:2).

RPA has been studied by consulting firms and software suppliers such as the Automation Anywhere, Blue Prism, IBM and UiPath. However, there is still paucity of research on the challenges facing technology's governance when it is used after its implementation. The administration and implementation of RPA technology entail a complicated series of interactions involving different stakeholders, each of which has specific functions and interests. As a result, structure and guidance are required, hence the development of the RPA governance framework.

Research questions were developed for this study to achieve the research objectives. Research goals were then established for each research question. Table 1 shows the study's questions and objectives, as well as the sections in which the findings are described.

Table 0.1: Research Questions and Research Objectives

Research Questions	**Research Objectives**	**Findings**
What are the specific skills requirements regarding RPA implementation and usage in CCCs?	Identify skills and technical knowledge needed to implement RPA in CCCs.	Section 2.2.1 Section 2.2.7 Section 3.2.1
How can the suitability of the chosen process for automation, using RPA technology through the UiPath software be assessed?	Identify the most significant tasks performed by UiPath to ensure that email step automation is achieved at the customer contact centre.	Section 2.2.4

	Identify specific features and functionalities of UiPath, applicable to the process of email management automation.	Section 2.2.9 Section 2.2.10
What is the difference between managing RPA and existing IT applications? and how does RPA UiPath software integration with legacy systems affect the output of the process selected?	Provide benefits and usefulness of adopting RPA UiPath in all groups of IT department personnel, end-users, and investors in understanding the vulnerability of unautomated processes.	Section 3.2 Section 3.2.4
	Establish how RPA can contribute towards the reduction of such risks considering existing legacy systems adopted by the chosen bank.	Section 3.2.2 Section 3.2.3 Section 3.2.5
How can misalignment between IT and business strategies affect RPA?	Identify how the process flow of emails management automation can be affected by misalignment between IT strategy of value delivery and the business strategy of best customer experience.	Section 4.2 Section 4.2.1
How can the governance implementation risks that come with RPA be managed?	Classify risks, restrictions, and benefits of automating emails management process using UiPath through the adoption of RPA technology.	Section 4.3
	Outline step-by-step processes or flow of emails management and how incorporation and usage of UiPath application software	Section 4.3.2

	can benefit both business management and IT management.	
How can the involvement of IT governance of every step help to achieve operational excellence and improve customer experience?	Comprehend the benefit of proper IT governance in implementing the UiPath application software in the email's management process and risks related to acquiring UiPath, its fit and complexities, availability, and auditability.	Section 4.2.3
What essential contributors will be addressed by the RPA governance framework?	Identify important stakeholders that are crucial in the implementation of RPA governance framework.	Section 3.2.1

(Source: Own)

1.3 Research Methodology

According to Ivančić, Suša Vugec and Vuksic (2019), RPA is currently more commonly implemented in practice than researched. As such, it is worth discussing the differences, similarities and complementarities between RPA and similar approaches, such as business process management and how they affect IT operations and governance. As Enríquez, Jiménez-Ramírez, Domínguez-Mayo and García-García (2020) further state, discussing and comparing RPA and other technologies, relative to this technology, is critical for the community to expand research lines. A Systematic Literature Review (SLR) and Design Science Research (DSR) were undertaken to comprehend RPA technology implementation and measure relevance of the UiPath application software to the chosen process of CCCs email management.

For Wewerka and Reichert (2020:2), SLR is defined by as "a method of locating, analysing, and interpreting existing research related to a certain research question, topic area, or phenomena of interest." In this context, SLR was carried out to examine the level of information and knowledge as well as relevant publications in the RPA research area. The SLR methodology was used in the following manner: the study first examined related literature, established theories and models, then reconstructed them to develop a specific framework for the RPA project implementation governance using the UiPath

software. Since there were different theories about RPA, a conceptual framework was developed based on correlating and identifying the most related literature.

The knowledge gathered from SLR was used in the DSR methodology to develop a framework. DSR is defined as "a research activity that invents or builds new, innovative artifacts to solve problems or achieve improvements" (Orynbayeva, 2020:6). DSR has introduced an engineering unique framework that solves fundamental practical issues. Concepts, designs, methodologies, and implementations are the four classifications required for developing a constructive research methodology and significant contribution to theory development, generating two outcomes: designs and scientific contributions (Orynbayeva, 2020:6).

DSR was considered useful for this study. First, the purpose of this research was to aid in the solution of a practical problem by inventing and creating a framework serving as the RPA governance model which uses existing standards and frameworks. Second, during the creative process, the study generated new knowledge about the RPA governance model's elements, challenges, and complexities. Third, the research domain was centred around the Information System (IS) discipline, because the UiPath is the RPA software technology defined as a system that collects and processes data to enable faster automated workflows using information technology. Last, this methodology included relevant assessment criteria that were critical to the governance framework to be developed.

The goal was to compare and evaluate the approaches proposed by different researchers. Following an analysis of various models and theories, the definition of robotics process automation contact centre emails management process utilising UiPath was established. Justification for the importance of process was also considered. A certain framework was constructed by combining theories from various fields. Theories relevant to key concepts were examined, specifically their RPA practicality and applicability to CCC, whereas some well-established theories and models were rejected because of being irrelevant to the research, which incorporates other advanced technologies and applications software not explored for this research. The concept design was based on relevant literature on IT, including its contribution to theoretical IT concepts and IT-related professional methodologies, that is COBIT 19, ITIL and ISO/IEC 38500:2015, among others, that provided practice-inspired recommendations.

1.4 Data Sources

The methodology for this research aimed at recognising and choosing many articles that introduced RPA and governance. A preparatory Google Scholar search was conducted to further refine the keywords and identify the websites and platforms from which RPA literature most likely originated. Following some preliminary paper extraction and classification, the search strategy was applied to multiple databases, including Springer Link, Semantic Scholar, and Google Scholar. A literature search was performed using RPA, governance, UiPath and other relevant keywords to the study, titles, abstracts, and full-text fields.

The search covered the period ranging from 2015 to 2021 when the RPA technology was involved to guarantee suitable coverage of published literature, also considering earlier literature that had laid the groundwork for on-going research. The search was conducted in two stages. Initially, only full-text, peer-reviewed articles in English were sought. Then, backward search was performed in the second iteration, and the scope of literature was expanded to include industry white papers cited in peer-reviewed articles.

1.5 The Scope of the Study

The following focal elements at customer contact centres were the focus of this study:

- Changing of manual attendance of emails to automated attendance using UiPath software;
- Adoption, transition of organisations and governance of RPA implementation;
- Alignment of business strategies and IT strategies for proper implementation and usage of RPA.

The study set out to select a suitable method for the process of email management, considering the process' governance and the effect of misalignment between IT and business operations on the chosen process technology and acquired software. It further sought to comprehend the ways in which the significance of accurate IT governance cascade on RPA software could benefit the deployment of UiPath application software in the email management process, as well as the risks associated with acquiring UiPath. Included was the software fit into the process and organisational goals, complexities, design dependability and traceability.

The study provides the benefits of the RPA UiPath adoption for different stakeholders. These include the IT department personnel, end-users, and investors. Further observed is to understand the vulnerability of unautomated processes, RPA contribution to risks reduction, outlining the step-by-step process flow of email management. Identifying how effective and efficient were the focal tasks conducted by the UiPath to ensure email attendance process automation in the CCC; and pinpointing specific UiPath features, and functionalities used in the email management automation process. Also focal were ways of using the technology to achieve higher levels of efficiency in managing customer emails while adhering to business IT governance guidelines by any organisation

To address misalignment between business and IT, the CCC email management process was used in RPA UiPath application implementation as a guide for deployment. A combined framework encompassing techniques already available in the robotics automation literature, accommodating all the steps of the selected process mentioned in the study's objective were considered. Control frameworks such as Control Objectives for Information Technology 19, Information Technology Infrastructure Library, ISO (International Standards Organization) ISO/IEC 38500:2015, and ISO/IEC 27000 series, widely recommended for IT governance, were used for governance and process management control. The developed framework servers as a guide for the chosen RPA application package UiPath implementation in terms of configuration, maintenance and decommissioning.

1.6 Limitations of the Scope

The study's focus was on the adoption, utilisation, and governance of RPA, using software application package UiPath, on the automation of email management process in CCC. The restrictions to the study were the prediction of uncertainty estimation and incremental learning of automation software robots adopted in conjunction with the RPA technology. Risks and restrictions regarding RPA technology and UiPath software were only limited to the chosen process. The technical aspects of algorithms used by the UiPath applications were not investigated or considered in depth. The processes described applied only to the theoretical study of any organisation.

1.7 The Structure of the Study

The study is organised into six chapters.

Chapter One highlights the aim of the study, as well as expected outcomes. The chapter also outlines the research problem, gaps, questions, and limitations of this study.

Chapter Two reviews the previous literature on the RPA technology and the application package considered for the research UiPath. The background to and context of customer contact centre operations are provided. The chapter describes the key concepts of the chosen technology and UiPath application software, showing how they can address customer contact centre email management processes.

Chapter Three identifies implications of RPA adoption for IT governance within organisations, and how failure to incorporate IT strategic objectives could threaten the adoption of technology and the end-users of the technology. The chapter also examines incremental risks of acquiring the technology, project plan and risk management.

Chapter Four considers misalignment between IT strategies and business strategies regarding RPA implementation. The effects of the lack of alignment, how they derail the effective and efficient IT operations of acquisition, configuration, maintenance, and decommissioning of any adopted RPA software application are discussed.

Chapter Five a framework is designed to establish how adoption and implementation of RPA can be executed in an organisation to manage and control CCCs email management process while ensuring IT efficiency and great customer experience. Guidelines on consideration of all stakeholders involved to make RPA technology adoption a success are established.

Chapter Six concludes the study and summarises the main findings of the study. The findings are thus summarised, analysed, and synthesised, followed by the conclusive remarks and recommendations for possible adoption on the premise of the formulated model.

2 CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter traces the literature regarding the RPA technology and the application package considered for the research on UiPath. The background and context for customer contact centre operations are provided. The chapter describes in detail the key concepts of the chosen technology and UiPath application software, showing how such concepts shed light on customer contact centre email management processes.

2.2 Literature Review

2.2.1 Robotics Process Automation

Robotic Process Automation (RPA) is a software platform that allows digital software applications to perform pre-defined tasks in the same way as do human workers (Mononen, 2020:6). The robot, which can be interpreted into a software package, is instructed, and configured to perform specific rule-based tasks, such as moving information from one place to another without any human intervention. This demands no notable change in the way of functioning compared to human beings; rather a robot can perform the same tasks more efficiently, effectively and accurately (Mononen, 2020:6). Application software robots are particularly well suited to processes with organised collected data and well-defined process objectives (Willcocks *et al*., 2015:4). RPA software is non-intrusive, reaching systems, just like humans, and it could be safely used by organisations (Willcocks *et al.,* 2015:4). In addition, industry experts imply that such criteria as confidentiality, manageability and traceability are effortlessly handled when using the RPA robots (Willcocks *et al.,* 2015:4).

In the context of business processes, the RPA robots perform tasks previously performed by people, such as transmitting data from multiple source systems like email and spreadsheets, to data warehouses, such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems (Lacity*, et al*., 2015:15; Kyheröinen, 2018:5). Robots may be programmed to scan emails, view PDFs, select relevant information, enter data into ERP systems, and send emails to specified supervisors when inconsistency or mistakes are detected; all these activities may be tracked in real-time (Moffitt, Rozario & Vasarhelyi, 2018:3).

Besides, the RPA robots are a more adaptable and a faster alternative than traditional automation, which was frequently incorporated at the back end of IT systems (Lacity & Willcocks, 2016:7). The RPA robots are a new area of business processes automation technology. They are considered portable process automation aids, which are integrated into the front-end of IT systems (Lacity & Willcocks, 2016:7). However, they differ from back-end system automation methodologies by using pre-existing system functionalities and user interactions (Lacity & Willcocks, 2016:7).

Viehhauser (2020:103) views the RPA technology as a sub-domain of business process management that is intended to automate processes using available IT architecture and infrastructure by employing robots to perform and manage tasks digitally. It is a general concept for a computer program or software

that uses scripted language to mimic and replicate human activities by imitating manual, screen-based manipulations and reacting to events on the screen. It can be programmed to acquire and analyse existing applications, process transactions, manipulate data, trigger reactions, and communicate with other systems. The RPA robots can be manually configured, designed using a graphical user interface, or skilled using documented process steps. The software also interacts with different software systems without requiring changes to existing applications because it operates on desktop applications and electronic systems in the same way that a human would (Viehhauser, 2020:103).

According to Osmundsen *et al.* (2019:6919), the robot collects already structured data from one or more systems, executes specified computations, and logs the findings into another system. Robots carry out repetitive or rule-based operations such as searching, multi-system lookup, consolidation, filtering, modelling, evaluation, and dissemination of business data. Different automations use these characteristics differently, though the robot does not keep any information (Osmundsen *et al.,* 2019:6919). The major effort in developing a robot is to configure or educate an RPA software package on how to do process operations, which is different from traditional software development where there was only configuration (Osmundsen *et al.,* 2019:6919). As Vishnu, Agochiya and Palkar (2017:69) suggested, RPA robots are simple enough to set up and implement, without any programming knowledge or expertise.

Robots are less expensive than human labour; they do not require holidays or overtime. Instead, they work twenty-four hours a day at reduced costs and with fewer mistakes, offering efficiency, precision, and dependability. Robot can execute the planned tasks swiftly and without human mistakes that may be brought by fatigue and interruptions in focus (Anagnoste, 2017:676; Willcocks *et al.,* 2015:5). Figure 2.1 below illustrates the positioning of RPA in existing processes, showing how they alleviate humans of certain tasks.

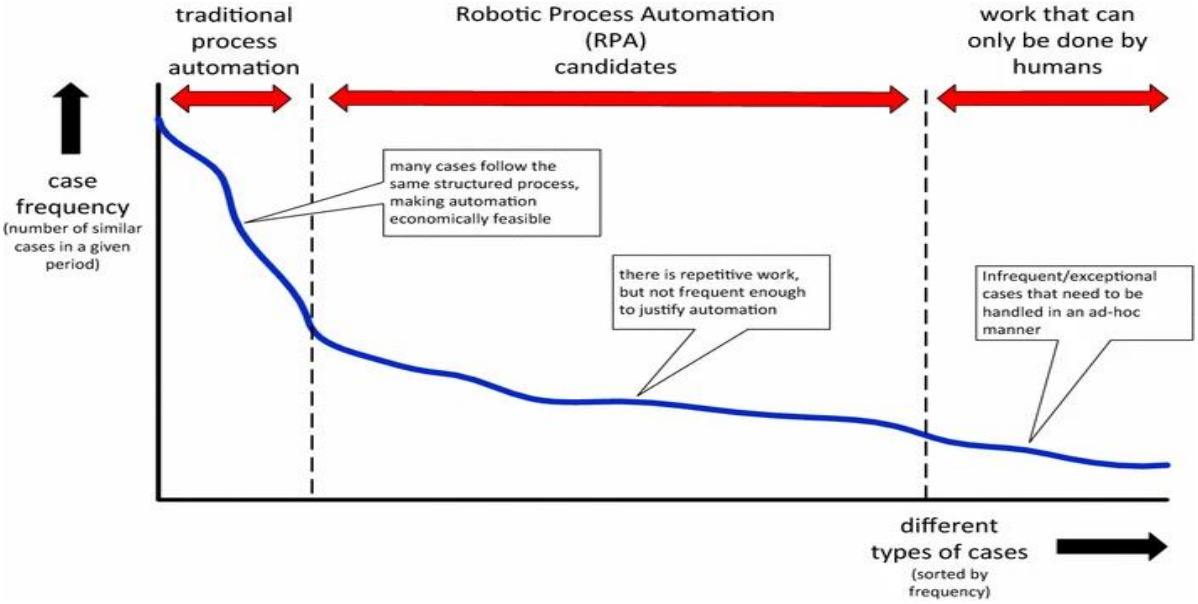


Figure 2.1: Positioning of RPA (Source: Van der Aalst, Bichler & Heinzl, 2018:270)

For Vishnu, Agochiya and Palkar (2017:71), RPA works best when the frequency of business change is modest, with changes to underlying systems being uncommon, as depicted in Figure 2.1. If the data does not change, nor does the system, robotic process activities may be used most efficiently. The activities that take place using legacy systems, with consistent data inputs that are not constantly updated, and the input data (format, standards, and type) is often stagnant after the first specification are deemed perfect candidates (Vishnu, Agochiya & Palkar, 2017:70). Because robots still require precise instructions to execute jobs, well-defined procedures are more automatable; any activities with uncertainty are unsuitable candidates for automation (Lacity & Willcocks, 2016:8).

In Fung's (2014:8) opinion, various variables should be considered to establish and analyse the applicability of any process to be completed by RPA. Fung (2014:3) further suggests generic RPA criteria for determining processes appropriate for RPA. The following Table 2.1 illustrates.

Table 2.1: Criteria for RPA

Criteria	**Description**
Low cognitive demands	The process does not necessitate a subjective point of view or interpretive abilities to make judgments and complete activities.
Transactions with a high transaction volume	RPA is recommended for tasks that are regular, high in velocity, recurring and often done.
Access to many systems	To complete tasks, a procedure requires access to numerous platforms and systems.
Management of occurrences is restricted	Highly formalised tasks with few deviations are essential candidates to be addressed.
Human mistake proclivity	Manual labour tasks and procedures that are more prone to mistakes and rework qualify.

(Source: Fung, 2014:3)

Moffitt, Rozario and Vasarhelyi (2018:3) maintain the RPA as having distinct qualities from other automation methodologies found in business process automation, business continuous improvement, and knowledge management systems. As noted above, the RPA robots do tasks just like people do through the software presentation layer, enabling logins, analysis, reports creation, data input and other tasks to be accomplished. Such robots are thus comparable to spreadsheet templates that automate certain activities. However, the main distinction between the two is that the RPA may be programmed to function with any existing workstation or computer software without guidance once programmed (Moffitt, Rozario & Vasarhelyi, 2018:3).

Lacity *et al.* (2015:4) offer three distinct characteristics of the RPA compared to other automations: RPA is easily implemented, with its integration requiring no end users with any technical abilities. However,

developers are required to have technical knowledge; RPA software is non-invasive, which refers to RPA software sitting on top of existing systems and accessing systems in the same way humans would; RPA is organisation safe, implying that IT requirements such as confidentiality, manageability and availability are met. Similarly, software robots can increase workers' capacity to execute cognitively demanding and unstructured activities, facilitating significant financial advantages (Lacity & Willcocks, 2018:318). Table 2.2 below summarises lessons learned from previous implementation of RPA aiding further understanding of distinct characteristics and elements of RPA considered in its life cycle of implementation.

Table 2.2: Eight Key Lessons for Implementing RPA

Lesson Learned	**Explanation**
Ensuring Business-RPA alignment	The RPA's purpose and meaning under an organisational strategy should be well defined and documented.
Defining the organisational structure	An organisational structure within which RPA will be implemented should be clear. The roles of RPA accountable people should be clear in the hierarchy.
Creating an RPA governance board	A board responsible for management control and tracking benefits of RPA should be created. The board will essentially define who keeps RPA momentum on-going and under control.
Having consensus on the RPA delivery approach	There should be an outline regarding the RPA flow process and delivery metrics.
Obtaining assistance	There should be a proper channel set-up for end-users to raise queries and request assistance with difficulties encountered with the RPA usage.
Establishing roles, duties, and management hierarchy	Requirements for RPA operations should be clearly defined, with a range of responsibilities and duties clearly elaborated.
Making a sustainable ecosystem	A low-maintenance infrastructure should be created and connected to the development stratagem.
Designing for scaling	Access controls should be formulated for RPA, based on the duties the robots and human resources perform to deliver set objectives.

(Source: Lacity *et al.,* 2015:5)

2.2.2 Types of Robots

The overriding objective of RPA is identifying the process prospects because automating incompetent processes causes inefficiencies, raises failure rates, and jeopardises the effective use of the RPA technology (Van der Aalst *et al.*, 2018:271). According to UiPath (2021i), the capabilities of the different robot types are similar. However, distinct types of software robots are categorised into two types: attended and unattended robots. The type of robot needed for a specific process automation is determined by its usage within an organisation to enable and ensure full optimisation of robots adopted (UiPath, 2021i).

- **Attended Robots**

Attended robots operate alongside humans on their desktops, supplementing the jobs and activities performed by users acting as personal assistants in accessing, planning, and conducting daily activities (Badhwar, 2021:273). Attended RPA robots are often developed for a user's workstation, using the user's profile or identification settings (Badhwar, 2021:273).

Because a human user is constantly present, attended automations should not be established or granted rights to undertake tasks that cannot be completed by the user (Badhwar, 2021:274). Attended RPA bots can be abused if the system on which they are running is in an automatic mode and has been infiltrated or penetrated by criminal organisations. Another case is when someone else takes over the workstation while the original owner is either absent or unintentionally discloses their credentials to another user (Badhwar, 2021:274). Any permissions necessary during the performance of an attended process should always be known and provided by the user initiating the automation (UiPath, 2021i).

- **Unattended Robots**

Unattended RPA robots are meant to run tasks and interface platforms, handle any runtime difficulties and mistakes without any need for human assistance, participation, or involvement (UiPath, 2021i). They are automations designed for more sophisticated and highly repetitive operations that are executed in batches and can be determined by a specified rule. Robots are often scheduled to do tasks or can be activated or prompted by certain events; they are well-suited to processes that execute restricted activities with required elevated rights and credentials (UiPath, 2021i).

Unattended RPA operates autonomously in the background, handling task-heavy, lengthy procedures, validating with staff for verification or if there is an exception (Badhwar, 2021:275). They may be used to remedy file or folder privileges on file-shares by deleting access for users who are no longer employed or do not have authorised access to a file/folder inside a directory structure (Badhwar, 2021:275). The RPA robots configured can learn by mirroring how humans handle complicated scenarios. Thus, RPA adopters should exercise extreme caution. Because of contextual changes, RPA robots that resemble people may begin to make wrong judgments. This might go undiscovered for some time, resulting in hazardous scenarios (Badhwar, 2021:275). When RPA robots imitate individuals, there are additional ethical and security concerns to consider when employing unattended robots (Van der Aalst *et al.*, 2018:271).

2.2.3 Benefits and Challenges Introduced by RPA technology

As previously highlighted in Section 2.2.1, RPA can be used in situations with significantly repetitive work (Willcocks *et al*., 2015:5). Because such tasks are more prone to human errors due to their monotonous nature, the RPA serves as an appropriate technology to automate them. It improves efficiency and task execution quality, while enhancing supervision and control of tasks by using existing systems and application interfaces (Willcocks *et al*., 2015:5). The scope for RPA modification and integration with closed systems, cost-reduction, better quality, accelerated deliverables and integration with legacy systems in developing a more standard approach to data management without starting from nothing are equally important for the technology (Vishnu, Agochiya & Palkar (2017:71). Because the infrastructure is already in place used by the RPA, the complexity of process integration is limited (Penttinen *et al*., 2018:4).

According to Willcocks *et al*. (2015:5:6), being an application-based technology, inputs in the RPA software are electronic, and the processes are regulated. RPA technology is agnostic, and robots may access any application or data source from the mainframe of other platforms like Excel, CRM, or ERP to online applications in an instance. Therefore, setting-up test environments for software dependencies as part of robots' deployment enables error detection before implementation (Willcocks *et al*., 2015:8). RPA is particularly useful in jobs with tight definitions, low cognitive load, and large volume because the RPA initiatives are also constrained by the RPA platform used (Penttinen *et al.,* 2018:4; Willcocks *et al*., 2015:6). As Penttinen *et al*. (2018:4) observed, the RPA assumes an existing infrastructure and demands well-functioning base systems, which might lead to challenges when there is no connectivity. Therefore, it is worth noting that without the incorporation of artificial intelligence, the RPA technologies cannot make judgments or adapt to changing environments.

Kirchmer and Franz (2019:33) identified drawbacks of adopting the RPA, any other automation technology. These include risks. RPA executes the precise actions that have been modelled for it to execute in business processes, if a business process is incorrectly represented, it may result in an undesirable consequence from an automated business process (Van der Aalst *et al.*, 2018:271). Wrongly performed automated business processes pose a risk to an organisation's performance, especially if they are not promptly discovered. Such threats become more prevalent as business process automation employs more artificial intelligence and is ineffectively monitoring the execution of processes, because robots can learn from hidden disastrous decisions, with activities bearing undesired outcomes from the business (Van der Aalst *et al.*, 2018:271).

Willcocks *et al*. (2015:35) stipulate further that understanding a substantial process is crucial to identifying and implementing the RPA process. Without such knowledge and alternative mechanisms for acquiring it, the benefits of RPA are significantly less important, because more time and efforts are necessary to secure it. RPA is frequently regarded as a danger since it is difficult to assess, once implemented, the robots can be flawed at an incredibly high rate with good stability leading to catastrophe for organiations. This is possible because RPA has a limited error detection methods built in (Willcocks *et al*., 2015:35).

Despite its advantages, RPA software robots have certain limits (Viehhauser, 2020:108). They perform what they are programmed to do and are incapable of resolving complicated, non-rule-based problems in which humans thrive (Viehhauser, 2020:108). They are not designed to address issues; rather, they are designed to do pre-defined tasks. According to Willcocks *et al.* (2015:35), robots are constrained by operational programs; if the process is initially flawed, the result will be impeded even if the robot executes its duties as directed. Controlled methods or processes are likely to hinder the robot's performance and restrict its efficient operational time (Viehhauser, 2020:108). Asatiani and Penttinen (2016:6) note the RPA for being the greatest match for large transaction volumes, and it is only a bridge software solution between manual human labour and large scale, operational level back-end automation.

One of the most noticeable weaknesses of the RPA is its too narrow scope to manage and automate large business operations at the organisational level on its own (K¨onig *et al*., 2020:143). RPA orchestration is often restricted to orchestrating robots, without providing for the orchestration of large or end-to-end operations. RPA systems lack the capacity to conduct tasks that cannot be performed using robots; human intelligence cannot be eliminated from all organisational processes because RPA does not provide concepts for performing manual cognitive duties (K¨onig *et al*., 2020:144).

In addition, the RPA may help businesses to do regular tasks more quickly and with more accuracy, but it can also make mistakes more quickly and with greater certainty. When unattended automations are employed, eliminating human intervention before conducting an action; inaccurate information or an inadequate specification of business rules can result in costly errors such as the incorrect output of expected outcomes. Therefore, control and consistent monitoring should be considered (Kirchmer & Franz, 2019:33).

2.2.4 Business Considerations when Choosing RPA Projects

Process and operational complication are two crucial variables for determining the potential for RPA. Likewise, the appropriate selection of automation duties is critical to any successful RPA deployment (Vishnu, Agochiya & Palkar, 2017:69). When deciding to deploy an RPA project within the business, factors could ensure its fit for the business imperatives, strategic objectives, and the specified process to be automated (Vishnu *et al.,* 2017:69). Suggested below are Vishnu ***et al.'s*** (2017:71) considerations:

- **Validation with compliance:** Business and technology stakeholders, as well as compliance, should validate process automation and modifications. RPA is effective in compliance reporting because it extracts data from personal computers, web-based applications, and core systems. However, RPA programming and regulatory requirements should be considered to guarantee completeness in functions and architecture, as well as its efficiency, to ensure that governance purpose of risk management is effectively defined and absorbed.
- **Installation of impact caution:** When integrating RPA into business processes, intellectual assistance is required. The technology should be developed to allow for other technologies like machine learning, so that robots may benefit from their incremental learning process and grow

more efficiently over time. Because robots can acquire poor behaviour, protective fallback and domain expertise would be required to reduce the danger of compounding improper behaviour. This helps to ensure that incremental risks do not impair its lifetime and that it keeps supporting future enhancements as a value added to the organisation.

- **Designing with practitioners and experts:** Methodologies should be created in collaboration with personnel with full understanding of the processes, subject matter experts who understand which systems operate best and which shortcuts are necessary for specific activities. However, developing RPA with people whose jobs may be replaced would necessitate combined RPA training and explanation. Embracing this ensures that the governance strategic goal of resource management is met, and change received.

2.2.5 Customer Contact Centres Overview

The availability of the internet has allowed for remote contact that is not constrained by the location of either the service provider or the customer (Mononen, 2020:9). Contact centres are facilities that specialise in handling distant connections with clients by telephone, e-mail and chats (Li, Koole, & Jouini, (2019:3661). Contact centres can be divided into two types: internal contact centres, which are supported by departments within the organisation with a corporate plan, and external contact centres, which are independent companies that provide services to other companies that outsource them to oversee their customer support (Li, Koole, & Jouini, (2019:3661).

Contact centres are intended to facilitate services to existing customers, promote products and services and maintain them, as well as recruiting new business in some situations (Wirtz *et al.,* 2021:42). They often carry out different contacts, such as phone calls, emails, chats, and other methods through which consumers may reach them (Wirtz *et al.,* 2021:42). Li, Koole and Jouini (2019:3660) expound that contact centres are mostly made up of employees referred to as ‘agents’, whose primary task is to handle clients from various communication channels. Customers within each channel can further be classified into multiple service categories based on their needs, with each service type correlating with a skill set assigned to agents (Li, Koole, & Jouini, 2019:3660).

Mononen, (2020:22) augment that, a contact centre agent's work may be broadly defined as interacting with consumers through digital and phone channels, assisting, advising, and assuring fulfilment to make customers continue their journey with an organisation. The job necessitates constant connection with consumers, as the primary duties of call centre agents are to engage with consumers (Wirtz *et al.,* 2021:43). Work duties are regular, with agents at contemporary contact centres being required to adhere to their shift patterns to service clients, and it is mandatory for them to pick their working patterns (Mononen, 2020:22).

Luo and Zhang (2013:29) outline the following generic duties done by agents at customer contact centres in different organisations within contact channels:

- **Calls:** When a call comes in, certain forwarding algorithms will route the call to an available agent (if any) who is qualified to handle the call. When no agents are accessible, the call is frequently held in a queue back-log waiting for the next available agent.
- **Chats:** Chats, like phone calls, are a real-time service. Chats, as opposed to phone conversations, allow operators to handle many consumers at the same time. It is because a client needs time to read and fill in the response, and this time may be used by the agent to react to other customers (if any). Even though the chat channel can be more effective, when a new conversation request is approved, the handling time of continuing talks can be longer.
- **Emails:** Unlike the other two channels, emails are not always replied to in real time since clients do not leave calls and chats while waiting for services. Emails are generally given lesser priority as opposed to other channels and are frequently permitted to be interruptible. Backlogs are created when emails are not addressed on the same day they are received, which is an essential indicator of an email quality of service. The waiting time for an email differs from the other two channels since the consumer should wait until a response is given at the convenience of the agent.

The administration of a contact centre's workers is sometimes segregated into its own role within an organisation, termed workforce management (Mononen, 2020:17). Managing a contact centre is a difficult endeavour, as firms must find a balance between personnel ratios to keep staffing costs down while maintaining service quality (Mononen, 2020:17). Understaffing a contact centre results in lower personnel costs, but it also leads to decreased service level targets, which could have other business ramifications like increased customer dissatisfaction. Overstaffing entails meeting service requirements and beyond and increased human expenses. Since labour expenditures are a key expense for the contact centre, workforce optimisation and management are required (Mononen, 2020:17).

2.2.6 Contact Centre Imperatives

According to Mononen (2020:9), while each business sector has its own set of goals, the difficulties and benefits associated with CCCs are shared by businesses and organisation departments worldwide. UiPath (2021i) states that CCCs management must manage and control three major imperatives and their blockers to stay competitive:

- **Retaining Customers and Drive Loyalty**

  Customers interact with CCCs by phone and email; the process entails asking customers to repeat unnecessary information, agents placing individuals on wait to check multiple systems, and repeated transfers. Even the most devoted consumers become discouraged by processes that require them to perform the effort. This is especially true for Interactive Voice Response (IVR) systems, which repeatedly ask clients for a slew of account information and history on the issue before failing to send it through to the agent. Higher phone calls volumes and mass emails compound these issues, resulting in delays, inaccuracies, and unfulfilled consumer expectations.

- **Improving Agent Effectiveness**

Contact centres operations that are time-consuming and labour-intensive sometimes demand personnel to examine as many systems as possible to handle a single client query. While being under pressure to minimise call times and email aging, and ideally fix issues on the first engagement, such operations yield complicated tasks. Such process inefficiencies result in a huge percentage of employee time spent on repetitive chores rather than rewarding, high value work that rewards both customers and employees. CCCs have the greatest turnover rate of any business because they should deal with similarly frustrated clients daily. This process not only disrupts operations, but it also harms the financial line of the ordinary organisations that spend thousands of funds acquiring and training new employees.

- **Modernising Operations**

Even when organisations aspire to modernise, heavily scrutinised budgets make investment in innovative technologies difficult to justify without proof of technologies' effectiveness. Choosing to stay behind the technological curve has economic and financial ramifications. Without correctly integrated technology, error rates in end-to-end processes would continue to rise, forcing workers to rework sections of the process, wasting time and money. Integrating innovative technology and applications with the capabilities of existing IT teams may be tough. Bringing CCCs teams up to speed frequently necessitates fresh training and investment in communications to ensure that everyone is on the same page.

The incorporation of RPA robots to CCCs can change the workflow layout of customer service agents, where robots' resources can enable the focus to shift towards activities that require higher cognition, without following rule-based logic (Mononen, 2020:12). This results in more client-focusing time for agents throughout the day, decreasing repetitive activities and restricting the range of customer support tasks performed during a working day. Reducing and automating agent responsibilities affects the design of their workday and gives them more time to focus on more challenging and cognitive tasks, saving costs for organisations (Wirtz *et al.,* 2021:43). Mononen (2020:10) adds that RPA in CCCs can allow agents to spend more time and focus on customer unique requests, decreasing their many engagements during the day, resulting in an increased employee engagement in CCCs.

Implementing RPA service robots in organisations revolutionises and re-organise customer contact centres, assisting in back-log control, service level agreements and creating desirable turn-around times on service requirements comparable to emails management (UiPath, 2021g). However, such processes need strong leadership and IT support, as well as employees' willingness and adaptability (UiPath, 2021e).

Figure 2.2 below depicts how the integration of RPA into a contact centre can afford a harmonious environment where robots and people work together. It illustrates how complex tasks that need human intervention can be completed while robots deal with those that do not need human decision-making (Wirtz *et al.,* 2021:42). Mononen (2020:15) states that the use of RPA towards a contact centre back-office activities can provide triple-wins in terms of operational efficiency, shareholder and customer value creation and enhanced customer service agent participation, resulting in staff value creation.

However, risks associated with the RPA robots such as robots gaining unwarranted access and failure or malfunctioning of robots should be monitored closely by agents and IT personnel (Viehhauser, 2020:111).

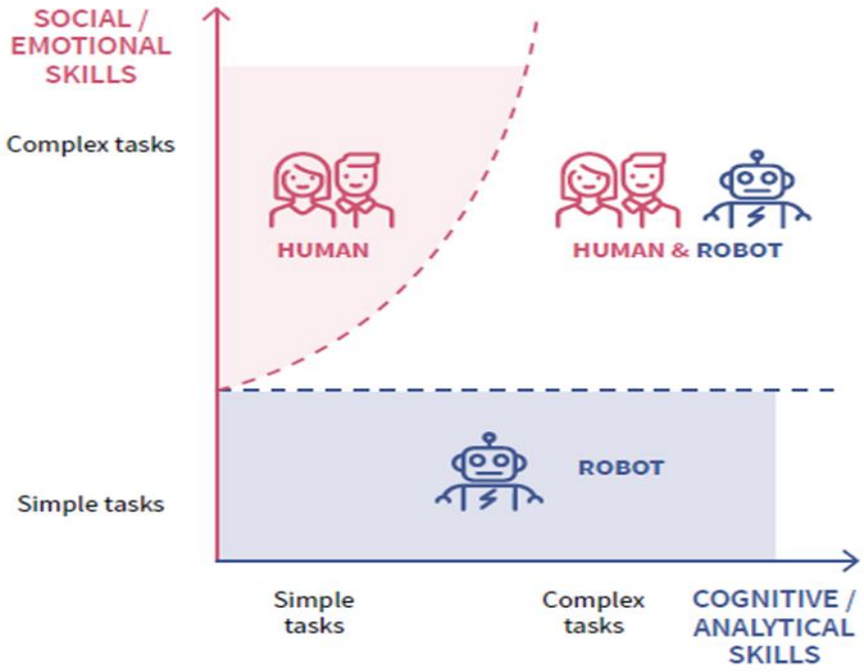


Figure 2.2: How to Choose Tasks to be Automated (Source: Wirtz *et al.,* 2021:42)

2.2.7 UiPath Application Software

UiPath software is one of the most extensively used RPA technologies (Ribeiro *et al*., 2021:53). It was developed in 2015 by a Romanian entrepreneur to provide software that may minimise laborious and time-consuming back-office responsibilities (Ribeiro *et al*., 2021:53). UiPath uses a one-of-a-kind technology to turn tedious jobs into automated tasks, making procedures more efficient and dependable. UiPath Studio is a comprehensive software technology that enables businesses to automate back-office repetitive operations (UiPath, 2021f). It transforms time-consuming processes into total automation, making work easier and faster. As noted earlier, UiPath robots perform the operations in the same way that a person would, using a built-in Studio software (UiPath, 2021f). UiPath robots can work unsupervised, that is, without any human oversight, in any setting, virtual or physical, or as assistants to a person to initiate the process (Ribeiro *et al*., (2021:53).

Ribeiro *et al*. (2021:53) maintain that UiPath platform allows for the design, modelling, and execution of workflows, the development and maintenance of robot connections, as well as the transfer of packages and queue management. It operates through storing log records and connecting them to Microsoft's Information Services Server (MISS) and Structured Query Language (SQL) Server, Elasticsearch (an open-source search engine built on the Apache License), as well as Kibana data visualisation plugin (Ribeiro *et al*., 2021:53). UiPath can improve the view of analytical information associated with the

execution of RPA processes. Artificial intelligence approaches and techniques are accessible through UiPath tool's User Interface (UI) automation module, paramount to which are identification, improvement, categorization, and information extraction allowing for automation of unique automations (Ribeiro *et al*., 2021:53).

In Gartner's (2021) Magic Quadrant, UiPath was described as an automation leader (Gartner, 2021). UiPath version 2019.10.3 was the RPA platform, which enabled robot development, multi-tenant Software as a Service (SaaS) and gained functionalities that allowed it lead against other automation software (Gartner, 2021). Table 2.4 shows the leaders, challengers, niche players and visionaries in all RPA technology venders where UiPath was established as one of the leaders by Gartner (2021).

Figure 2.3: Magic Quadrant for Robotic Process Automation (Source: Gartner, 2021)

Forrester (2021) also views UiPath as one of the leaders in RPA systems. Forrester Wave recognised the UiPath's leading role in the first quarter of 2021, using a rigorous and open-review approach, with the highest score in each of three categories: current offering, strategy, and market presence (Forrester, 2021). Figure 2.3 below provides the visualisation of how UiPath was deemed a leader. Forrester (2021) attributes the scoring to UiPath Marketplace, which is shared with Microsoft, Salesforce, Workday, and other platforms, which have over 1,000 reusable components for automation services. Furthermore, UiPath robots run on either physical or virtual computers while simultaneously interacting with all the client's legacy systems, including ERP, web-based applications, cloud, Citrix, Java and mainframe applications (Anagnoste, 2017:680). UiPath platform collaborates with industry leaders such as Google,

Microsoft, and IBM to deliver cognitive and machine learning capabilities when dealing with data providing options for further digitisation of robots (Anagnoste, 2017:680).

Figure 2.4: Leaders in RPA Technologies (Source: Forrester, 2021)

As discussed, UiPath has invested in growing its product line to maximise the value that automation offers to its clients (Forrester, 2021). UiPath has the automation cloud, which manages a hybrid cloud that includes both public cloud and on-premises equipment. It has a platform for automation named Centre of Excellence (CoE). CoE is a team that leads leadership and best practices; once the CoE is created, all robots are supervised, and future projects or adjustments required by the current robots may be addressed in a lean methodology to avoid any risk against the organisation's success.

UiPath provides services for organisations with the benefits of scaling early in the decision-making process (Anagnoste, 2017:679). Studio, which is a feature of UiPath requires no programming knowledge. However, there are some features aimed at advanced developers like integrated AI capabilities that identify and extract data from unstructured, semi-structured, and structured documents while scanning at high speeds. The platforms' robot-triggering functionalities are constrained; however,

workarounds are available. The security, access control and authentication features are paving way, with UiPath providing an enterprise-grade and creative RPA technology that is reinforced by a broad ecosystem of partners, making it an excellent match for vast, transnational companies with demanding support and governance requirements (Forrester, 2021).

According to Anagnoste (2017:679), UiPath enterprise RPA platform delivers a scalable and secure automation solution. The platform made up of three major segments: UiPath studio, UiPath orchestrator, and UiPath robot. Figure 2.4 displays the correlation between the three segments of the UiPath platform.

- UiPath Studio allows the creation of automations in an easy-to-use visual editor. Regardless of intricacy or magnitude, UiPath Studio can automate any business processes.
- UiPath Orchestrator is the core configuration tool for the virtual team. UiPath Orchestrator readily accommodates multi-tenancy, allowing for distinct functional RPA efforts with segregated data and independent permissions.
- UiPath Robot carries out the automation built in UiPath Studio. Robots are classified into three types: attended robots, which are activated by user input, unattended robots, which function automatically in the background and hybrid robots which encompass the attended and unattended by working with the user and in the background.

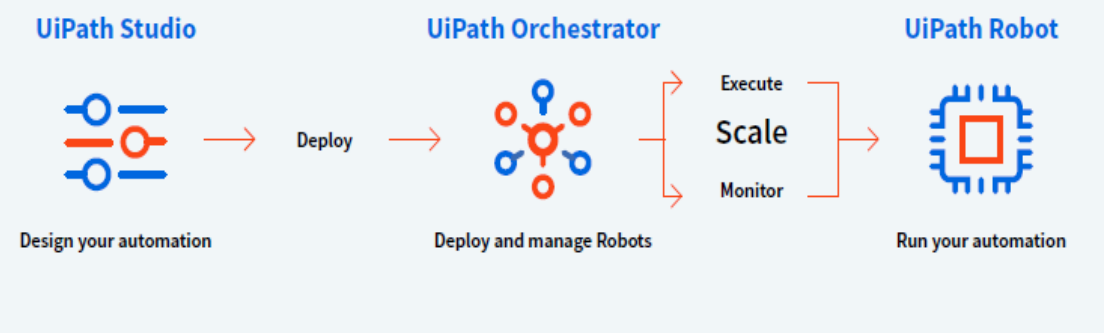


Figure 2.5: Elements of the UiPath RPA Platform (Source: UiPath, 2021f)

UiPath like any RPA automation requires defined processes to work effectively and efficiently (Anagnoste, 2017:679). In situations where the processes are not defined or inconsistent, UiPath offers a feature called task mining (UiPath, 2021b). Offered by the UiPath RPA application software, the feature that identifies processes as employees complete daily duties (UiPath, 2021c). Organisations may use task mining to record the operations of chosen users, analyse them collectively, and display the findings in multiple dashboards to:

- Identify automation possibilities by analysing the procedures that often appear in the user action data;
- Understand the regular path and variants for the candidate processes to standardise and agree on the process before automating and describing the specifics of a candidate process to expedite automation development.

UiPath platform validates that adoption of RPA software addresses manual practices with automation, with every process step formerly done manually, automated, providing value while efficiently dealing with uncertainty and resources (Anagnoste, 2017:679: UiPath, 2021g).

2.2.8 Types of Automation Offered by UiPath

The UiPath platform robots allows look-up of different tasks that make up a process, how they relate to the activities of employees and how they interact with other processes and systems. They identify which tasks are best suited to automation and which type of robot is suited to a task (UiPath, 2021j). Robots are not mutually exclusive; organisations have the power to easily bring all these automations together into a single, secure and scalable integrated automation platform managed and controlled by them. Such flexibility uses the deployment models that best suit business requirements (UiPath, 2021j). Below is the detailed description of diverse types of automation by the UiPath (2021j):

- **Unattended Robots**

The need to process massive amounts of data is one of the major use cases for RPA. For most organisations, data is stored across multiple systems and data stores – some legacy and some modern – requiring staff to frequently move data between systems. Data is amended, updated, and verified as it passes through the process. Manual data processing on this scale is time-consuming and prone to errors. Other forms of automation can be difficult because many systems do not have an Application Program Interface (API) that allows for easy integration. Programmed UiPath unattended robots, need less involvement of human interaction in the process completion. Figure 2.6 illustrates the workflow as follows.

An unattended UiPath robot can:

- Launch automatically based on scheduled, event or activity triggers;
- Be managed centrally by a workflow 'orchestrator' to function 24 hours a day 7days a week;
- Carry out the same procedure in the same manner every time;
- Only notify a human if an exception arises.

Figure 2.6: Workflow of Unattended Robots (Source: UiPath, 2021j)

- **Attended Robot in an Interval**

Individual employees spend most of their time within a process that is consumed on accessing, compiling, reformatting, reviewing and validating data. They visit several systems, both internal and external, to the company; such activities are always time-consuming and labour-intensive. More

importantly, boredom and fatigue quickly become factors for error rates, even amongst the most diligent. Working alongside the employee, all monotonous and repetitive tasks are offloaded to the attended robot. The user triggers the robot when it is required, and it takes control of the keyboard and mouse to complete the task in a fraction of the time and without an error. Figure 2.7 illustrates the workflow.
An attended UiPath robot can:

- Launch on-demand using mouse-clicks or hot keys;
- Run the process directly from the robot tray (Application);
- Complete the task in the same way as the employee;
- Complete the task and return the process to the employee.

By making portions of processes more efficient, an attended, interval automation brings cumulative benefits. The individual employees become more productive, and as the automation scales so does the specific teams, and business function where they are deployed. However, this automation takes over the employee's machine so that it cannot be used for the duration of the process. The employee needs to plan their time to perform offline tasks that maximise the time freed.

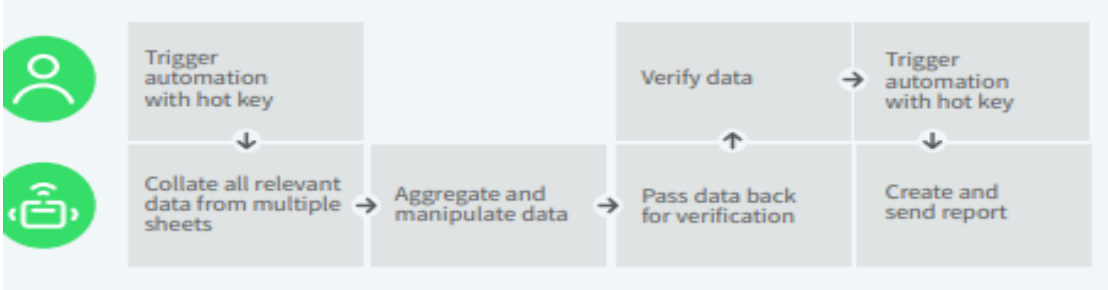


Figure 2.7: Workflow of Attended Robot in an Interval (Source: UiPath, 2021j)

- **Attended Robot in Tandem**

On some occasions, it is impractical or inefficient for a robot to gain control of the user's machine. An employee may need to retrieve information from multiple systems when dealing with a customer query, putting the customer on hold while retrieving the data leads to poor customer service. An attended-in-tandem automation allows the robot to handle some tasks in the background while the user can continue working. The division of labour means that the robot handles the repetitive tasks such as system access, data retrieval and data aggregation while the employee can talk to a customer or make decisions based on the information supplied by the robot. An attended robot can work in tandem with an employee to complete tasks such as connecting directly to a database, accessing multiple systems and applications, automating an application in the background, or connecting to systems through an API. Figure 2.8 illustrates the explained workflow. In this automation, the robot can:

- Run processes when triggered by the user;
- Monitor user activities and automatically launch process;
- Run the process directly from the robot tray (Application);
- Execute process while the user continues to work on the machine.

Providing timely and accurate information is one of the benefits of this type of automation. By implementing business rules within the automation, the robot can begin to offer guidance and recommendations – such as the next best action – to improve employee performance. Adding AI to this type of RPA automation allows for guidance to continually improve over time.

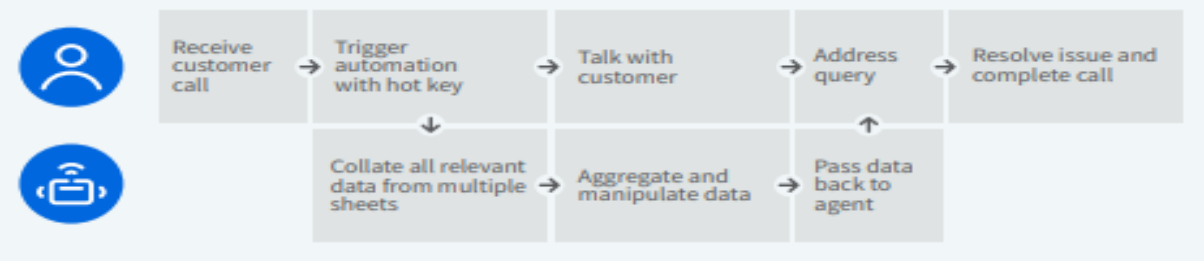


Figure 2.8: Workflow of Attended Robot in Tandem (Source: UiPath, 2021j)

- **Hybrid Robots**

The attended robots help with customer facing processes, and unattended handle heavyweight back-end processing, while hybrid automations bring them into a single integrated platform. This enables to automate much more of business processes end-to-end. Combining attended and unattended robots brings in flexibility and scalability. Organisations can identify tasks that are prime for automation across an enterprise-wide process and can deploy the ideal robot for that activity. Hybrid automations are suited to processes that will always involve a high degree of human intervention, including a good deal of back-end processing. Figure 2.9 illustrates the workflow below.

UiPath hybrid automation can:

- Kick-off an attended robot from any machine;
- Chain attended and unattended robots together;
- Enable the attended robot to trigger the unattended robot when required;
- Allow both the attended and unattended robots to return the process to the agent, where further action is required;
- Allow attended and unattended robots to function together automatically where no human intervention is required.

In addition to the efficiency and productivity benefits of hybrid automation, it enables organisations to increase visibility into their key business processes to build an enterprise automation for making the processes more robust.

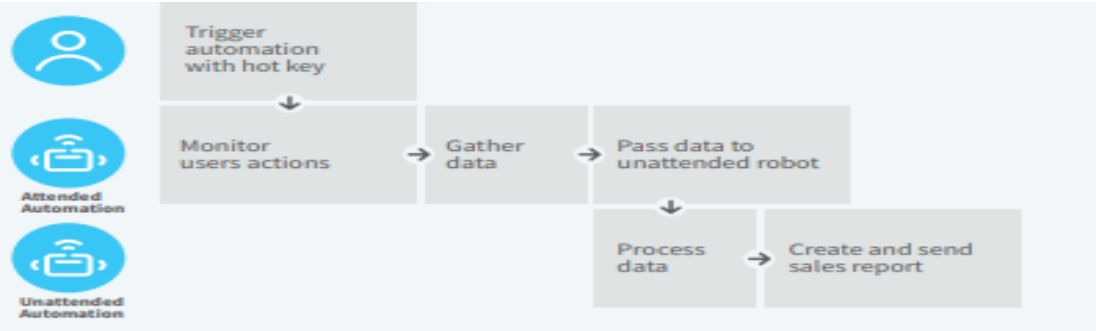


Figure 2.9: Hybrid Robots' Deployment (Source: UiPath, 2021j)

One or more robots may sit on virtual machines or back-office servers and execute the unattended automation. An administrator sets the schedule in their RPA platform and allocate the optimal number of robots to the process. With full auditability, data integrity and regulatory compliance can be assured (UiPath, 2021j).

2.2.9 Advantages and Disadvantages Associated with Acquiring UiPath Software

The RPA UiPath software platform does not alter the fundamental deep structure and architecture of current systems or data architectures, resulting in a less complex integrated architectural structure and data requirements that do not need modifying the system logic or interfaces (Ribeiro *et al*., (2021:53). According to Penttinen *et al*. (2018:4), the RPA using existing systems and programming interfaces, contributes to the IT Governance strategic goal of resource management for efficiency and effectiveness. It also enhances value delivery with less risk management owing to the security already in place in current systems (Penttinen *et al*., 2018:4).

When setting robots execute processes, several tools and procedures exist, such as recording workflows, utilizing graphical interfaces with process flowcharts, or using scripting language (Lacity *et al*., 2015:4). Process libraries may be built from modelled process pieces and contain explicit step-by-step instructions for robots to follow, allowing for easy governance of robots and well-defined value delivery (Penttinen *et al*., 2018:4). However, there are few error-detecting algorithms included in application packages, which might cause problems with automating (Lacity *et al*., 2015:14).

Gartner (2021) detail the following as UiPath application's strengths and weaknesses through the survey they conducted with software's customers.

Strengths

- **Integration and partner ecosystem:** UiPath's advantage is its large partner ecosystem, which includes over 250 technology partners and excellent support for integrations with all key business products and applications. The UiPath has a thriving marketplace, with over 1.5 million downloads. It has a 750,000-developer community which contributes automation and AI libraries in its marketplace, where they can be purchased as preconfigured, reusable components enabling different organisations from which to choose.

- **Operations:** UiPath provides different options to assist customers in developing and scaling up RPA projects. UiPath provides its clients with regular upgrades and crowd-sourced knowledge sharing through free community editions and a continuing focus on learning tools, online training, and an active developer community.
- **Product portfolio:** UiPath's RPA technology range is far reaching with components like an acquired process discovery, a task capture recorder, analytics through UiPath Insights and upgraded AI fabric components. The orchestration engine in UiPath handles complicated, long-running operations that are outside the reach of RPA. The UiPath's RPA platform also offers developer experiences tailored to certain personnel for both technical and citizen developers.

Weaknesses

- **Pricing:** UiPath's pricing has shifted from a collection of products to a platform model and role-based pricing. UiPath's pricing has become more complicated because of this expansion and change. Further, UiPath's reference customers rated it worse in terms of value for money than those of other leading RPA suppliers.
- **Customer support:** Certain facets of client satisfaction with UiPath have declined from past years, serving as a cautionary note to UiPath's outstanding operations and product experience. UiPath reference customers reported that the company's fast expansion has resulted in a loss of client touch, as seen by unconnected operations, with lack of co-operation between software and support divisions.
- **Product upgrades and deployment:** Customers that used UiPath product versions 2018.4 or earlier reported issues with both upgrading and deploying the product. Many customers cited that UiPath has focused on complex capabilities like machine learning and process mining rather than improving fundamental RPA functionality. It has further been claimed that UiPath stressed speed of delivery over product quality on product upgrades.

2.2.10 UiPath Application Software and Customer Contact Centre Emails Management

In today's business environment, email is one of the most trusted, dependable, legitimate, genuine, and widely used ways of communication (Patel, Shukla, Porwal & Kotecha, 2019). To get a complete picture of how contact centres can manage the customer experience with RPA, ways in which the UiPath can assist contact centres in overcoming email management challenges and enabling elevated levels of responsiveness, efficiency, accuracy, and productivity when compared to manual practices are considered (UiPath, 2021i).

With communication methods spanning from emails and phone calls to social media, web chat and self-service platforms, the technology ecosystem of customer support has grown increasingly sophisticated (Patel *et al.,* 2019). CCCs operators are frequently confronted with non-consolidated customer support toolkits and a lack of efficient cross-channel offerings in their everyday activities (Patel *et al.,* 2019). Because of the complexities associated with numerous communication channels, it is problematic to enforce a uniform procedure and experience across the channels, and customers' transactional data

and history are frequently maintained in non-integrated, dispersed applications (Deckard 2018). UiPath provides CCCs with a low-risk transformation method that applies intellectual automation across the full customer care lifecycle as depicted in Figure 2.10, offering agile implementations that adapt to changing environments and continuous processes maturity through an orchestrated experience from continuous learning (UiPath, 2021i).

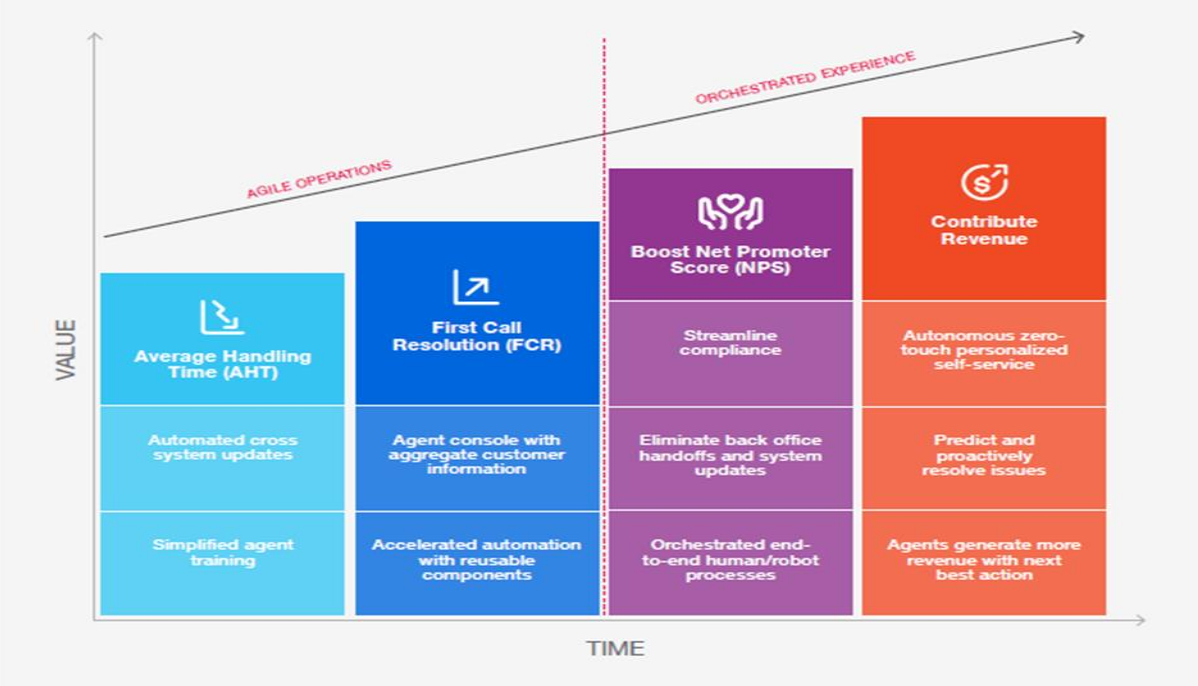


Figure 2.10: Contact Centre Automation Maturity (Source: UiPath, 2021i)

While handling contacts with a single consumer, call centre workers should traverse between various unconnected systems and applications (Willcocks *et al*., 2015:5; Kyheröinen, 2018:5). Changing between channels shifts emphasis from the client, reduces agent productivity, and may jeopardise data veracity and regulatory compliance (Willcocks *et al*., 2015:5; Kyheröinen, 2018:5). Such complexities not only reduce the frequency of email resolutions, but they also reduce customer satisfaction owing to lengthier processing times, uneven communication, and inconsistent experience across channels. Thus, there is a need for a clear process capability through which the UiPath provides through automation maturity as shown in figure 2.10 (UiPath, 2021d).

Organisations can make the most of their contact centres by optimising co-operation and interaction between CCC personnel and customers (UiPath, 2021g). UiPath enables businesses to enhance customer satisfaction and long-term revenue potential associated with greater rates of email quiries resolution, improved cross-selling and up-selling exploitation, individualised customer interaction and reduced contact times (UiPath, 2021g). The integrated software technology helps the customer service ecosystem by offering call centre operators with a single touch point across all channels, allowing for a seamless focus on the consumer (Deckard, 2018: Anagnoste, 2017:683). As a result, UiPath enables businesses to establish a customer-focused contact centre and a customer-focused organisation (Deckard, 2018).

As Deckard (2018) affirms, automation is fast becoming prevalent in the call centre business due to the benefits it provides to both contact centre personnel and their clients. An automated call centre can provide faster, more efficient, accurate and profitable customer service by anticipating client behaviour, providing tailored assistance, decreasing call wait time, and assisting operators with in-depth information (Deckard, 2018). UiPath (2021i) validates Deckard's statement of achievable possibilities owing to UiPath's comprehensive automation solution by offering:

- **Real-time customer service agent guide:** Through UiPath, contact centre agents may quickly change information in various channels at the same time without having to bounce between screens and lose attention during a conversation or an email work-on. Agents may save time by using dynamic search options and data management systems based on a unified knowledge repository. They can also reduce call abandonment rates and email wait-time thorough various robots' offerings that can work in the background to identify customer email needs. Furthermore, UiPath software Robots deliver real-time up- and cross-selling recommendations to agents.
- **Dynamic and adaptable user interface:** UiPath combines a simple, easy-to-learn process designer with an enterprise-grade management solution that can be implemented in the cloud or on-premises. All software robots may be handled from a single interface, which is configurable according to the skill set and aptitude of a call centre representative. The number of active software Robots may also be instantly scaled up or down to fit the ever-changing client demand in CCCs settings.
- **Customer behaviour prediction:** Using pre-existing historical information on a customers' requirements (for example, prior purchases and page views), the UiPath platform may assist forecast a customer's actions, behaviours, and complaints. With better understanding of the client, CCC workers can better position their services to meet the demands of customers in a more customised manner than ever before.
- **Error-free and high-security processing:** Allowing for automated data entry and system navigation, UiPath assures processing security while also reducing mistakes formerly caused by contact centre workers' high-pressure, manual environment. Further, the robots' activities are kept in a central log for regular inspection using Elastic-search, conveniently retrieved in the case of an investigation, and adjusted to reflect regulatory changes.
- **Automated notetaking:** UiPath's automated data capturing, and processing ensures that an agent's wrap-up work is simplified, efficient, and less time consuming. Following a conversation, overview scripts are automatically generated to dramatically boost wrap-up stage efficiency and minimise the normal handling time of client requests. With more time on their hands, agents may respond to more emails and hone their customer-centric abilities in maintaining existing client connections and obtaining new ones.
- **Using UiPath in the front office:** The contact centre, which manages a company's interactions with its customers through phone calls, emails, online chats and self-service portals marks the core services provided to clients owing to the customer experience of the company.

Although the UiPath offers many RPA technology solutions for research, the solution that will be focal is UiPath Studio. The studio is a solution guide that allows business users without coding expertise to automate their processes (UiPath, 2021). There is no need for users of this UiPath solution to have skills in computer programming, thus enabling a smooth transition into the adoption of the technology to existing employees (UiPath, 2021). Figure 2.11 portrays all the characteristics of the UiPath studio.

Figure 2.11: UiPath Studio Offerings (Source: UiPath, 2021f)

The first step in automating the CCCs using UiPath Studio is to identify activities that need automation (UiPath, 2021i). Such activities are the basic building blocks of an automation project, each representing one or more manual tasks automated by the Studio; a sequence of related, interconnected activities makes up an automation project (UiPath, 2021f). When considering automating a repetitive process, a breakdown of that process into each of the individual manual steps should be considered, with activities that automate each of those steps identified in Studio. Organisations may use Studio to automate processes involving emails from the Outlook desktop program, Gmail, and Outlook 365 (UiPath, 2021d).

UiPath enables email automation by providing an account to automate as a capacity to the automation, through Use Outlook 365, Use Gmail, or Use Desktop Outlook application actions, including operations that use data from the account within the specific resource activity (UiPath, 2021d). When customising the selected actions, the acquiring organisation can choose email data from the drop-down menu button in Studio. Data may be retrieved from Outlook folders and Gmail labels. Emails selected from desktop client when the project is run, assists Studio orchestration, where data is gathered from message fields like Subject, Body, Body as HTML, Bcc, Cc, To, From, and Date (as text) for analysis (UiPath, 2021d).

The most efficient method to solve for clients' email queries is through email automation, which UiPath offers (Patel *et al.,* 2019). This reduces turnaround times and saves organizations the time and effort of responding to repetitive emails. UiPath solution uses diverse activities pathway to automate emails which include but not limited to; opening browser activity, attaching window activity, opening mail

activity, typing into activity, data craping and getting full text activity for IMAP mail Message to send SMTP mail message log for each activity (Patel *et al.,* 2019).

Connected customers want connected experiences, hence the administration and tracking of emails has become a challenging endeavour as email usage grows quickly (Patel *et al.,* 2019). An optimal amount of time is spent reading, browsing, and replying to these email communications by a CCC agent. However, most of the emails that go to CCCs have a predictable structure and pattern in terms of their content, and they typically call for straightforward responses (Patel *et al.,* 2019). By automating email attendance, it is possible to improve unique user experience by delivering reliable and interactive responses to incoming email enquiries through UiPath diverse robots, with suitable segmentation, efficient schedule and customised replies (Patel *et al.,* 2019).

With the use of attended robots, unattended robots, and hybrid robots that process client incoming emails on the back end of email pool, UiPath is capable of accurately automating email responses (Patel *et al.,* 2019). Figure 2.12 below depicts automation interception after an email is received, where UiPath robots read emails on behalf of an agent, summarises contents of an email through set robot algorithms, through key words in the body or subject of an email match to existing keywords defined in the system and generating response to an email without intervention of agents thus optimising email attendance and management.

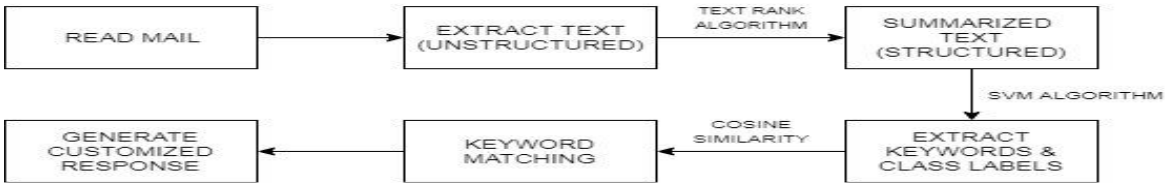


Figure 2.12: Automation of Emails (Source: Patel *et al.,* 2019)

UiPath provides mail activities pack are intended to aid with the automation of any mail-related processes, including IMAP, POP3 and SMTP (UiPath, 2021d). Besides, UiPath has activities designed specifically for dealing with Outlook and Exchange (UiPath, 2021d). This corroborates that UiPath software package solutions that can facilitate automation of any email process required. In this way, it suitably works with bulk emails received into the customer contact centre, sorting them into required priority and distributing to specific users for attending and authorisation (UiPath, 2021j). UiPath further offers a customised feature through RPA testing, where businesses can define the inputs, expected results and outputs to check whether automation projects are functioning as desired. Users can also view activity coverage during execution and confirm that the behaviour remains the same while making changes to a workflow through UiPath assistant (UiPath, 2021j).

The UiPath assistant is a tool designed expressly to make comfortable the user's engagement with UiPath robots from their desktops (UiPath, 2021j). It is the location where users can access, manage, and perform automations with a few keyboard strokes. The display may be tailored to the person by

selecting an appearance and a name for the robot, organising procedures in custom folders on the launching pad, or switching to a different theme. UiPath assistant serves as a link between people and robots (UiPath, 2021j).

Sending an automated response to new incoming communications is a typical practice in business culture specifically contact centres, though general and restricted in its value (UiPath, 2021j). A system can be created to automate the time-consuming operation of manually responding to thousands of emails (Patel *et al.,* 2019). According to UiPath (2021a), organisations can use UiPath through the orchestrator API to carry out specific tailored release administration tasks such as:

- Create assets (robots)
- Create Queue
- Upload Package
- Create Process
- Create Environment.
- Add robots to the environment and provision robot from an input excel file to target orchestrator instance (considering organisation units).

This automates the process of replying to a customer, reducing the time-consuming effort of manually reading email by personalising the response based on the user's inquiry and generating a response appropriately, with the system demonstrating the efficacy of the approach in its execution (UiPath, 2021a).

Contact centres are company's principal point of contact with its clients. However, historically call centres were viewed primarily as a service delivery conduit for inbound calls (Legros, Jouini & Koole, 2020: 950). In recent years, modern contact centres and emails have become a regular means of communication. For organisations to retain customer service and enforce specified customer experience and service level agreements, automating their attendance around the clock opens an opportunity for CCC agents to attend customers who prefer conventional methods of relationship management as all services or processes at a contact centre cannot be automated (Legros *et al.,* 2020:950). Figure 2.13 shows contact centre processes transformation before and after UiPath automation, highlighting a decreased contact time with a customer through self-service automation and intelligent robots, thus allowing agents to focus on tasks that require human input while robots work unattended and in hybrid mode in the background.

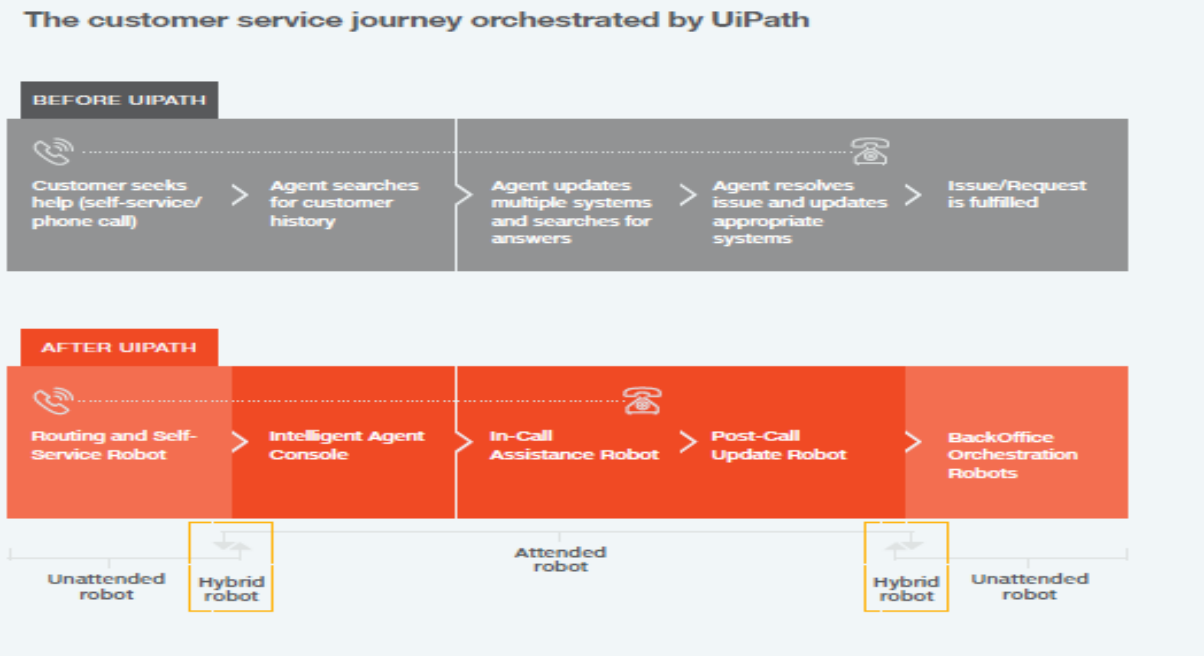


Figure 2.13: Customer Contact Centre Journey after Incorporating UiPath (Source: UiPath, 2021i)

UiPath uses RPA to make businesses enhance CCCs operations (UiPath, 2021g). UiPath changes the direction and operations of teams for the better, lowering error rates, reacting faster to customers, and holistically optimising workflows throughout the company (UiPath, 2021g). UiPath can be used to automate CCCs by helping organisations to implement and grow sustainable RPA adoption in contact centres by facilitating the end-to-end advanced analytics of an organisation's customer support lifecycle through the services below (UiPath, 2021e):

- **Self-service and Routing for Customers**

The deployment of unattended robots, such as AI-powered chatbots, aids in the resolution of client concerns through a more effective self-service, enhancing the use of human agents by lowering call traffic by up to 50%, while raising customer satisfaction and promoting consistency. UiPath enables contact centres to expedite and streamline the deployment of omni-channel support experiences, resulting in a faster issue resolution and more time for agents to focus on building customer-focused skills and complex email attendance. As a result, quality improves, lowering operating costs, and increasing customer loyalty.

- **Console for Intelligent Agents**

Equipping agents with intelligent agent support tools powered by an attended robot provides them with a holistic picture of client information. They could collect data from diverse systems, including those without APIs, within a minimum average handling time. Using a shared code base, the UiPath enterprise RPA platform can enable flexible software robots to migrate from any agent desktop to any self-service channel. The robots' artificial intelligence, machine learning and neural language processing capabilities solutions operate with any telephone, email hub or information system, and its multi-tenant architecture is compatible with different software. Additionally, irrespective of the processes that

organisations are addressing with RPA, UiPath community of industry-specific RPA partners can provide quality assistance.

- **Back-office Management**

Deployment of unattended robots in the back office to minimise back-office tasks allow agents to manage and resolve errors with clients in real-time. UiPath may be used to simplify the customer experience and orchestrate the end-to-end customer service journey by providing the customer with a simplified experience with the customer care agent and tools for the agent to ease back-office orchestration.

- **Handoff Automation**

The worker or a resource in the loop features of UiPath enables the connection between unattended and attended robots. As such, more complicated client scenarios requiring human agent involvement to be directed from self-service channels to a live agent and give the agent with the context of the issue or demand as well as any other important customer data are essential. This hybrid functionality is also used between the agent and the back office, with any system updates being sent off to unattended robots to handle post-call activities.

The UiPath software provides a robot management solution that can aid contact centre administrators in controlling and monitoring the access and activities conducted by acquired RPA technology (UiPath, 2021i). Contact centres using UiPath robots can benefit from having access to various robots including hybrid bots, which are a mix of attended and unsupervised bots. Given the configuration of most contact centres, hybrid solutions can help contact centre managers to regulate unauthorised access to other agents' workstations or shifting of workstations, resulting in an unproductive and inefficient contact centre (UiPath, 2021g). Robots may be managed by allowing automated robot generation for the specified user identification. The robots can be produced automatically based on parameters supplied by selected individual organisations to setup and manage them on the UiPath program. Contact centre managers may activate automated robot creation at the user level, providing its execution parameters and login credentials (UiPath, 2021g).

2.3 Conclusion

This chapter has covered the RPA technology. The chapter has contrasted RPA with other technologies, customer contact centres and the duties they handle, and UiPath application software and its connection to automation. The integration of RPA UiPath into CCCs has also been examined.

This chapter has established that understanding the operations that can be completed by RPA is crucial to determining areas of RPA technology and UiPath software used to assist in attaining them. Adoption, governance, and execution pose challenges for CCC activities that may be solved using the RPA methodologies. Such challenges and their solutions are considered within the framework of the RPA implementation governance in Chapters 3 and 4.

3 CHAPTER THREE
IT GOVERNANCE AND RPA

3.1 Introduction

This chapter identifies governance over information technology in relation to the adoption of RPA usage as it falls within its proximity. IT governance within organisations can be detrimental to the adoption governance of the RPA technology and to the end-users of the technology, therefore, failure to incorporate IT strategic objectives in RPA will be addressed. The incremental risks of acquiring the technology, project plan, business process management and risk management are investigated.

3.2 Adoption of Robotics Process Automation Implications and Governance Overview

To create and execute the RPA technology, organisations should comply with certain information technology regulations, particularly those relating to controls, governance, and security (Willcocks *et al*., 2015:4). Willcocks *et al.* (2015:22) investigated a large telecom company's RPA setting up and found that "RPA usage grew, and an enterprise RPA capacity began to be established, backed by both business units and IT resources, only when the IT department with governance structures got heavily involved" (Willcocks *et al*., 2015:22).

Mohamad and Toomey (2016) also noted that, as more business is transacted online through the internet, IT-dependent business transactions and capital investment on IT software, hardware and infrastructure are likely to expand significantly, requiring governance and efficient regulation over information technology. The coordination of management and the IT department over an acquired software is known as IT governance; it also includes the creation and implementation of effective policies and procedures that control behaviour and the adoption of these policies and processes throughout the organisation (Mohamad & Toomey, 2016).

IT governance is essential to an organisational strategy since it is concerned with goals that guarantee provision of value to the company is regulated efficiently by IT (The Institute of Internal Auditors, 2018). The effectiveness of scaling up RPA is dependent on adequate governance, which includes establishing guidance, policies, and methods to oversee and regulate RPA operations to reap the anticipated advantages from technology (Willcocks *et al.,* 2015:31). It is critical to ensure efficient use of the RPA robots, their intended function and adherence to the organisation's security regulations (Willcocks *et al.,* 2015:31).

3.2.1 IT Governance

Information Technology Governance (ITG) has been described as practices that assure an organisation's effective and efficient use of IT to fulfil its operational goals. IT governance directs and controls the current and future use of IT; it ensures that stakeholder requirements, conditions and alternatives are investigated to assess balanced, agreed-upon enterprise objectives and goals. The achievement of such objectives and goals arrived at through setting a direction over prioritisation and decision-making and monitoring performance and compliance through ITG (Gartner, 2019; ISO/IEC 38500:2015; ISACA, 2021).

Figure 3.1 below depicts the governance universe and how it is interconnected. Corporate governance, also known as enterprise governance, is established as the foundation of general organisational governance with IT governance as a sub-set (Mueller *et al.,* 2008:7).

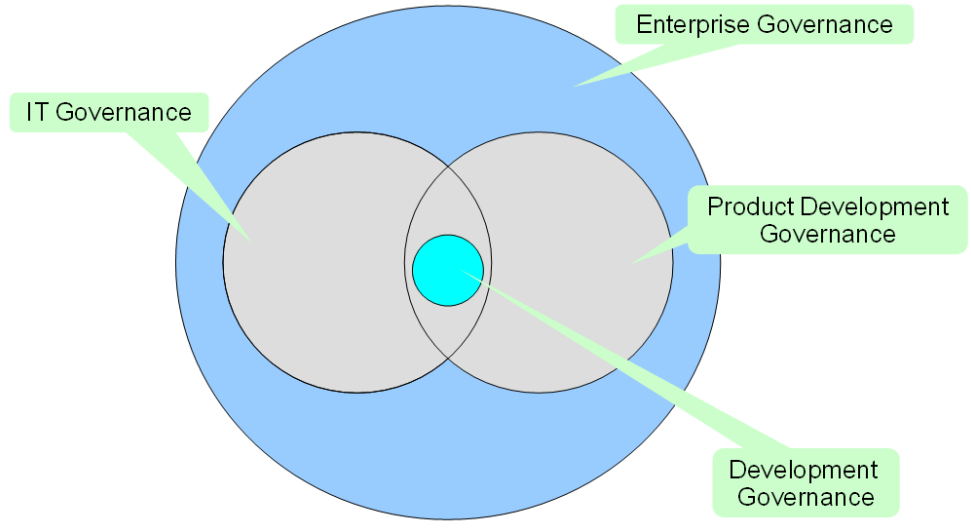


Figure 3.1: Types of Organisational Governance Relationships (Source: Mueller *et al.,* 2008:7)

IT governance is responsible for the strategic direction of IT as well as for the synchronisation of IT and the business in terms of services and projects, business objectives, up-to-date IT strategy, and the linking of business objectives and IT activities as shown in Figure 3.2 (Mueller *et al.,* 2008:18). Janssen (2019) further considered IT governance to be assisting in determining whether certain relevant mechanisms guarantee mitigation of technology acquisition risks. It further ensures that enterprise risk management includes risk aspects of IT investment opportunities (in this case, RPA acquisition), defines risk management obligations, common risk analysis methodology, and strategies for addressing risks, monitoring and management of threats, incidence, and implications comprehensively (IIA, 2018). Figure 3.2 demonstrates that IT governance leads to improved adoption of newly acquired technology, its efficiency and effectiveness comprehensively (Mueller *et al.,* 2008:18).

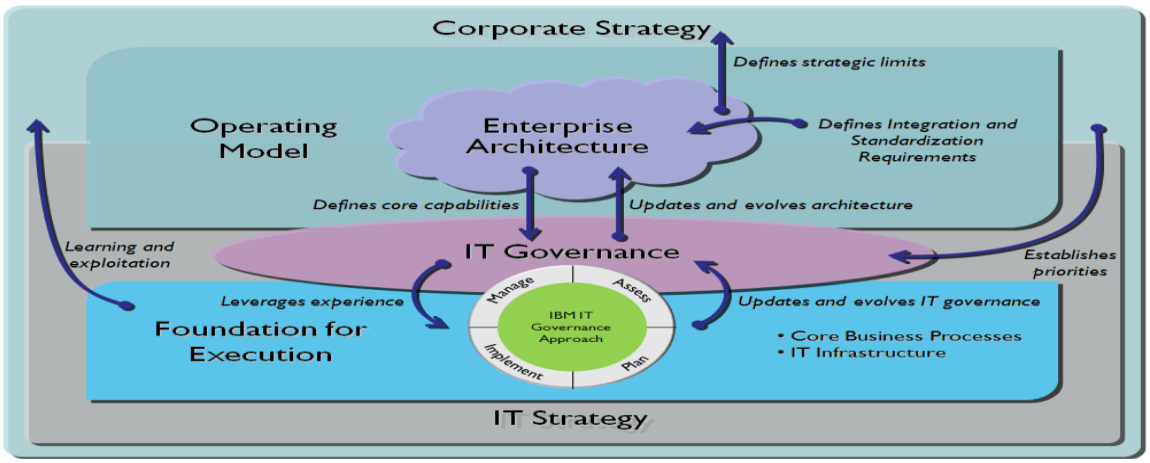


Figure 3.2: IT Governance in Full Business Context (Source: Mueller *et al.,* 2008:18)

According to Mohamad and Toomey (2016), IT governance has at times been misunderstood for effective management practices and IT control frameworks. However, ISO 38500:2015 has shown IT governance as the overall structure for guiding and regulating IT employed by directors, concerned with the management of IT capabilities on behalf of investment stakeholders. The directors responsible rely on management to establish the required management systems and IT controls (ISO 38500:2015).

Gómez, Bermejo and Juiz (2017:140) identify the following important components of IT governance as employed by organisational directors:

- IT Principles: Clarifying the business role of IT.
- IT Architecture: Defining integration and conformity assessment requirements.
- IT Infrastructure: Determining shared and enabling services.
- Business Application Needs: Specifying the business need for purchased or internally developed IT applications.
- IT Investment and Optimisation: Determining which initiatives to fund and how much to spend.

IT governance differs from IT management by having a continuous life cycle (Hamidovic, 2010:1). IT management is the process of making and putting choices into action while IT governance is concerned with those in authority to make significant choices, those with input, and those responsible for putting those decisions into action (Hamidovic, 2010:1). IT governance is concerned with decision-making authority, whereas IT management is concerned with making and implementing IT choices (Hamidovic, 2010:1).

The most important criteria for an IT governance solution involve constructing flexible architecture that is strategically aligned with the organisation and can be modified if necessary. IT architecture as the co-ordination and strategic alignment of several IT governance disciplines, is key to determining whether an organisation can fully harness and enhance its diverse skills (Mueller *et al.,* 2008:53). Table 3.1 below explains the enablers of IT governance solution in an organisation that ensures that that the constructed solution is sustainable and delivers value. All the enablers are discussed, showing how they enhance viability of the governance of RPA.

Table 3.1: IT Governance Enablers

IT Governance Enablers	Definition
Principles, Policies, and Frameworks	Principles are instruments for obtaining best practices to assist high-level management in undertaking informed decisions in accordance with the business plan. The principles are meant to enable individuals to exchange processes, systems, technologies, and data, as well as to direct people in meetings or steer sessions to the optimal route for reaching corporate objectives in an organisation. A framework focuses on IT administration and control while also establishing organisational norms. It uses IT resources to manage processes to achieve business

	objectives. It also serves as a bridge between the other enablers and is driven by content and context. Policies define how information should be supplied and transferred to decision makers and offer direction, control, and business alignment for the company. They also serve as a guide for process decisions and serve as a link between corporate and business unit governance enabling better understanding of RPA software.
Processes	Mechanisms are a collection of behavioural actions that provide a set of outputs to help to attain IT goals. They guide and control a company to achieve commercial objectives. The processes are used to oversee decision procedures and should be affected by the organisation's policies and ideals. Processes ensure that IT policies suit the demands of the company. They are also seen as characteristics that assist firms in developing strategic flexibility, hence achieving business value. Well defined processes facilitate integration of RPA software by providing a clear pathway for automation.
Organisational Structures	Organisational structures serve as the foundation for decision-making units within a company, they also increase the efficacy and efficiency of internal operations. Organisational structures are linked with the organisation's strategy and objectives; they define roles and duties, and they establish IT-business committees. They are responsible for ensuring smooth information flow within a company. A properly defined hierarchy enhances integration of RPA software as everyone in the organisation knows their roles and expectations in terms of RPA functionality.
Culture, Ethics and Behaviour	To influence important decision-making and encourage IT use, culture should build a set of concepts and a vision. A company should have a transparent and participatory culture to encourage the strategic use of information and the acceptance of IT governance. Ethics are a collection of principles that encompass values, beliefs and behavioural patterns to boost an organisation's dedication, creativity and overall financial success. Employees should be encouraged to display ethical behaviour. Behaviour improves the business-IT strategy alignment and the adoption of ITG practices within a company. Behaviour supports and implements continual business improvement and encourages a desirability to use IT. The behaviour of contact centre agents towards RPA software should be monitored to ensure harmonious embrace of changes.

Information	A stream of messages creates, uses, retains, destroys and transmits information. Information has value and is one of the company's most valuable assets. Information disbursed about RPA acquired software should be predictive and give useful feedback regarding the organisation's objectives.
Services, Infrastructure, and Applications	Infrastructure, technology, and applications that deliver economic value at a company are examples of services. They should concentrate on planning and providing customer reliability, performance and security. The infrastructure includes the hardware, software, databases, networks, and the people who operate these structures. Applications should be designed to suit business requirements while also enforcing ITG processes. To create a strategic business value, applications should prioritise automation and digitalisation. A well supported RPA software performs as expected detecting errors early when the service offered by legacy systems understands its importance.
People, Skills, and Competencies	Personnel in an organisation have their own roles and duties; they oversee producing business value, given that ITG people are at the tactical or strategic level of an organisation. Skills are the talents employed to add value and play a significant role in people's lives. There is a correlation between people skills and competencies, with employers preferring candidates with a mix of business-centric and technical abilities, as well as an entrepreneurial, flexible and agile attitudes. Even though there are no programming skills needed for operational roles in RPA, developers need skills to run RPA code, hence establishing skills for different roles involving RPA in functioning as expected.

(Source: Henriques *et al.,* 2020:56)

Bouayad, Benabbou and Berrado (2017) confirm that ITG is becoming an increasingly significant issue for all organisations and developing and implementing an IT governance plan is not straightforward. As such, it enables greater exploitation of the potential of information technology to produce a corporate value and improve overall IT performance. According to González-Rojas, Gómez-Morantes and Beltrán (2018:134), the use of governance approaches differs depending on the context. IT governance capabilities for practice differ at multiple levels such as strategic, tactical and operational, within an organisation.

IT competency is closely tied to the long-term effects of senior management actions (Bouayad *et al.,* 2017). Everyone is involved in IT governance, including board members, top management, personnel, and customers. Such competency is foundational to the organisation's transparency and accountability by integrating individual decisions and ensuring decision traceability into assigned duties (Mohamad & Toomey, 2016). The view has been shared by Mohamad and Toomey (2016), who note efficient IT

governance for being critical to an organisation's effective delivery of IT. IT governance's mission is to highlight all successfully managed IT endeavours, with their performance matching the IT strategic objectives. The ITGI (2018) divides IT governance into five domains:

- IT's strategic alignment with the business;
- IT value delivery helps the organisation to maximize advantages by delivering suitable quality on schedule and within budget to achieve the promised benefits;
- IT risk management includes ensuring openness regarding key risks and assessing the enterprise's appetite for risk, as well as ensuring correct handling of IT risks;
- IT performance measurement entails employing a balanced scorecard that extends outside short-term financial measurements.
- IT resource management includes best using and investing in and allocating IT resources.

To achieve the above IT strategic objectives, the following principles guide those charged with governance as adapted from ISO/IEC 38500:2015:

- **Responsibility:** Every member of the organization needs to recognize and embrace their roles in the need and usage of information technology and acquired software. Accountability for acts include the power to carry out activities. This cascades from corporate governance to RPA software management.
- **Strategy:** The organisation's business approach encompasses the organisation's immediate and potential IT capabilities. IT strategic plans address present and predicted business strategic demands.
- **Acquisition:** IT acquisitions are done for legitimate reasons (RPA acquired because it is needed), based on adequate and continuous assessment, with open and unambiguous conclusions. In both the short and long term, there is a suitable balance of rewards, prospects, expenses, and threats.
- **Performance:** IT is designed to serve the company by delivering enough quality services to fulfil current and future demands.
- **Conformance:** The IT function abides by all applicable rules and regulations. In this regard, policies and procedures are explicitly stated, enforced and mandated.
- **Human behaviour:** IT policies, procedures and actions value human actions, along with the existing and growing requirements of all relevant parties. Human resources' contributions to software usage should be recognised.

The ISO/IEC 38500 standard establishes sustainable governance practices and offers a dynamic and open-communication system between governance and management. These best practices are built on three major activities:

- **Evaluating:** Assessing the current and future usage of information technology, including plans, proposals and supplier contracts (internal and external).

- **Directing:** Allocating duties to the purpose and guiding the formulation and implementation of plans and policies. Ensuring that initiatives are properly transitioned to production, considering the operational, commercial and infrastructural implications as well as encouraging an organisational culture of excellent IT governance.
- **Monitoring:** Ensuring that IT performance is monitored and adjusted according to the plan using measurement techniques.

The three actions listed above are included in the ISO/IEC 38500:2015 model of IT governance, as depicted by Figure 3.3. Figure 3.3 illustrates a distinction between the IT governance and the IT management. Strategic plans, policy metrics, as well as proposal and performance measurements, combine the two layers of business management and IT governance management completing the control and direction processes of IT assets. The governance layer supplies the management layer with principles and policies, while the management layer oversees solutions that satisfy the specified goals. Performance measurements for IT activities within the organisation form part of the governance layer.

The link connecting management and governance layers demonstrates how they should work together towards achieving the organisation's goals by IT (Gómez *et al.,* 2017:142). Conflicts in communication should be resolved, necessitating the construction of bridges between management and IT governance, as directed by the company (Gómez *et al.,* 2017:142). Governing entails both creating and conveying actions. ISO/IEC 38500:2015 promotes more efficient leadership by bridging the gap between governance and management (ISO/IEC 38500:2015).

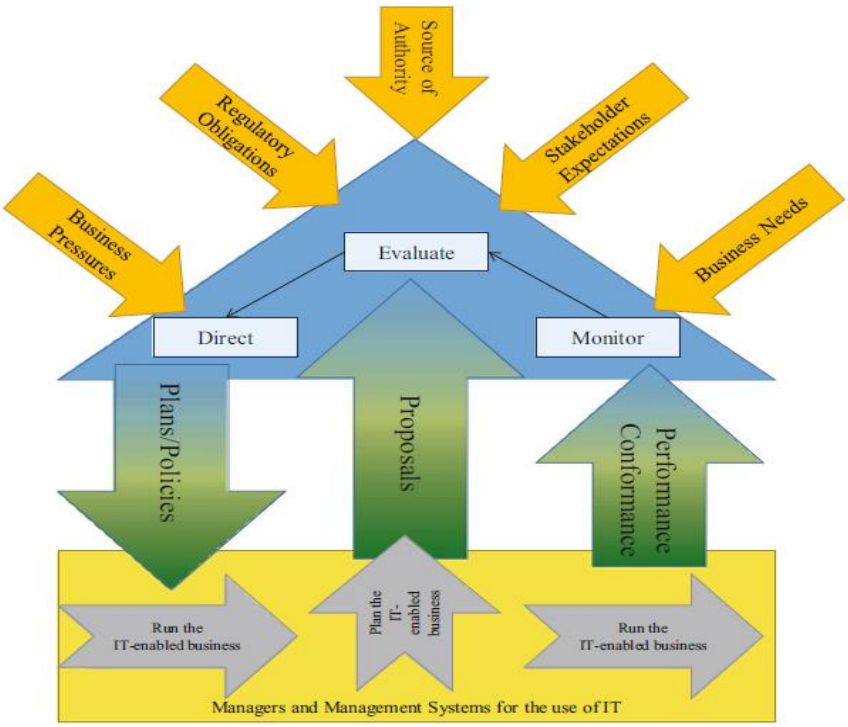


Figure 3.3: ISO/IEC 38500:2015 IT Governance Framework (Source: Gómez *et al.*, 2017:142)

While bridging the gap between governance and management, controlling risks and maintaining compliance are critical for effective governance. Also equally critical is the provision of value to the

organisation, effectively monitoring successes through resource management and managing risks associated with RPA technology software acquisition (González-Rojas *et al.,* 2018:139). Table 3.2 below describes the principles of IT governance applied to three levels of operations within an organisation as in strategic, tactical and operational.

Table 3.2: Capabilities of IT Governance Table

	Strategic	**Tactical**	**Operational**
Decision-making support	Decision-making structures are defined. Decisions made among different structures are aligned. Decision-making responsibilities are clearly defined. The decision-making archetype is known and aligned with expected IT behaviour.	Decision-making archetypes are defined and recognised for each type of decision. The agreements on decisions are formally defined. Framework implementation initiatives consider stakeholders to create an implementation plan. Decisions are made only by those formally defined to make them.	All decisions are clearly identified and classified into one of five decision types. Governance model is based on proactive mechanisms over reactive ones. Defined agreements are periodically monitored using technical tools.

	Strategic	**Tactical**	**Operational**
Risk management	There is a culture of risk awareness throughout the organisation. The appetite for risk and the level of risk tolerance are both explicitly defined. The IT risk policy is clearly established and matched with the company risk policy. Within the organisation, risk awareness activities are undertaken.	IT threats that might have an impact on the company are explicitly recognised and analysed. There is a strict understanding of who is accountable for IT risk: owners and management. There is an IT risk management strategy that collects data on the threats that have been recognised.	IT risk cost-benefit evaluations are conducted on a regular basis. A business continuity strategy is created and tested on a regular basis. IT risk measures are implemented, based on a cost-benefit analysis and industry best practices. IT threats are calculated. IT inspections are conducted on a regular basis to discover and address risks in IT assets.

	Strategic	**Tactical**	**Operational**
Value delivery and alignment	Measurement of value delivery follows a set of well-defined principles. IT expenditures are allocated depending on a set of criteria, example being higher benefits, lesser risk	The IT portfolio is regularly reviewed to ensure that advantages are being transferred. Organisations are always on the lookout for new ways to improve their IT portfolios. Organisational factors are used to prioritise new IT investment initiatives. The IT portfolio is examined on a regular basis to ensure that it is up to date with organisational developments.	An IT portfolio is a collection of data about IT operations, resources, and acquisitions. Project management approaches are used in IT investments and projects. IT service delivery of business value is quantified.
Performance Management	From the stakeholders, there is a written description of anticipated performance of IT services. There is a knowledge of the business value that IT provides.	Expected performance agreements are formalised with stakeholders. Formal assessments are carried out to assess IT performance.	IT services are compared to the expectations of stakeholders. IT assets are examined on a regular basis to ensure that they are used efficiently to meet business needs. Human resources are efficiently leveraged

	Strategic	Tactical	Operational
			to support a variety of corporate activities.

(Source: González-Rojas *et al.,* 2018:139)

3.2.2 IT Governance and Robotics Process Automation Technology

ITG has been established as essential to an organisational strategy from the previous section since it is concerned with goals that guarantee IT value to the company in a regulated and effective manner (The Institute of Internal Auditors, 2018). According to the Information Technology Governance Institute (ITGI) (2018), IT governance is concerned with two things: The IT delivery of value to the business through technologies acquired as well as the reduction of IT risks. The former is fueled by IT strategic alignment with the business, while the latter is motivated by the incorporation of accountability within the company. However, both should be supported by proper resources and assessed to ensure that the desired outcomes from acquired technologies are achieved.

ITG is critical in generating an economic value for organisations (Bygstad, 2017:181). Figure 3.4 shows the tasks and activities of an effective ITG, also summarises the elements that impact on IT governance, both directly and indirectly. Figure 3.4 further showcases ITG as responsible for the strategic direction of IT. Further noted is the role of ITG in the alignment of IT and the business in terms of acquired technology, services and projects, business objectives, up-to-date IT strategy and the linking of business objectives and IT activities.

Bygstad (2017:181) further affirms that ITG assists in determining whether mechanisms guarantee ways of addressing risks for acquired technology applications. With such a guarantee the risk management processes include risk aspects of IT investments, defining risk management responsibilities related to acquired applications, common risk analysis methodology and strategies for addressing risks. An on-going comprehensive monitoring of vulnerabilities, incidences and implications is also critical.

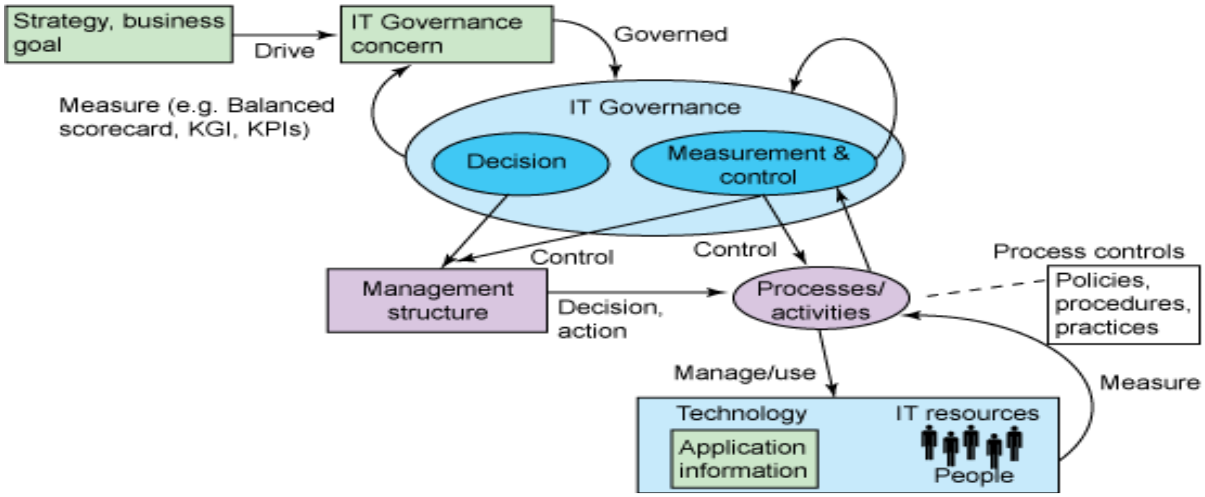


Figure 3.4: IT Governance Components (Source: Mueller, Magee, Marounek & Phillipson, 2008:5)

RPA process architecture is concerned with the requirement for IT standards and norms as mentioned in Chapter 2. Stakeholders should consistently supply data to the application to make other stakeholders comprehend the data (Lacity & Willcocks, 2016:3). Such application should be considered at every level of the technology's Software Development Life Cycle, but in the case of RPA, it is in each process step (Lacity & Willcocks, 2016:9). However, organisations should not just modify their internal procedures for collecting, maintaining, and using data to meet the RPA applications standards (Post, Kas & Smit, 2020). A specified architectural framework for technology adoption, installation, administration and discontinuation influences the implementation and general end-user usage. Thus, a standard framework should be used to regulate any RPA application software obtained, coupled with ITG in adopting the RPA application software.

RPA technology is data-centric; any misunderstanding may negatively impact on the quality of data used by the technology, rendering it obsolete (Willcocks *et al.,* 2015:6). Willcocks *et al*. (2015:6) stressed a robust data supply chain which allows RPA application software interactions with other systems and maximising the promise of automation. Adding, Moffitt, Rozario and Vasarhelyi (2018) suggest well governed collaboration with the IT department through its governance as an excellent practice for RPA deployment, with RPA being an enterprise-led solution.

For Penttinen *et al.* (2018:2), managers should analyse the present interactions in their systems and potential future stability in using RPA. To avoid misalignment, managers should carefully assess the stability of their existing systems from multiple perspectives when considering process automation alternatives, and actively involve the IT department in the development of RPA capabilities and functionalities at an extremely early stage of implementation. Misalignment can be harmful since it might result in an underfit or overfit of the selected application, leaving the model unauditable and inaccessible when it is required to function (Penttinen *et al.,* 2018:2).

3.2.3 Business Process Management and RPA Governance

Kirchmer and Franz (2019:9) found some organisations as struggling to leverage RPA's full potential and 30–50% of the adopted RPA projects fail altogether. The value-driven RPA methodology solves issues and capitalises on the possibilities of easy tasks completion, presenting a method for focusing on the proper sub-processes to automate, improving business processes while considering the end-to-end process context and sustaining the outcomes through appropriate governance and combination workforce management (Kirchmer & Franz, 2019:9). RPA process-led digital transformation management discipline leverages the capabilities of Business Process Management (BPM) to achieve the full value of digital efforts quickly and with a low risk while using agile concepts in conjunction with the necessary concentration and direction (Aguirre & Rodriguez, 2017:66).

A business process is a collection of operations that is carried out in an organisational and technological setting (K¨onig, Bein, Nikaj & Weske, 2020:134). Such operations collaborate to achieve a corporate purpose. Business processes are essential to every business, being comprised of interconnected actions that, when completed, supply a service or product to a client or achieve an organisational objective (Penttinen *et al*., 2018:3). With each process automation, effective configuration governance and maintenance of the chosen application software should be evaluated (K¨onig *et al*., 2020:136).

Business Process Management (BPM) is described as concepts, methods and strategies that aid in the design, administration, configuration, enactment, and analysis of business processes (K¨onig *et al.*, 2020:133). BPM is the formal depiction of business processes, including their activities and the constraints that govern their implementation. Once business processes have been developed, they may be analysed, improved, and implemented (K¨onig *et al.*, 2020:133). RPA is a subdomain of BPM that automates existing processes using accessible IT infrastructure and employing robots to do tasks digitally (Lacity & Willcocks, 2016:7). According to Lacity and Willcocks (2018:270), RPA is distinguished from BPM by three different properties already mentioned in the preceding chapters which are non-intrusive, non-programming skills required and non-retainage of transactional data. Table 3.3 below shows the distinct features between RPA and traditional business process management which in this context is described as traditional automation.

Table 3.3: Differences Between RPA and Traditional Automation

	RPA	**Traditional Automation (BPM)**
The primary application	End-to-end operations should be automated.	Each script has a certain role.
Functional Level	Simulates user activities.	It does not replace user actions.
Programming abilities	Low to average	High
Integration of complex systems	There is a low reliance on past software architecture.	There is heavy reliance on earlier software architecture.
Test and development time	Low	High

Scalability	Expansion is technically simple.	Expansion is technically difficult.
Maintenance	Technically easy to maintain.	Scaling is restricted.
Cost	Short time – costly Long time – low costs	Short time – low costs Long time – high costs

(Source: Lacity & Willcocks, 2018:292)

The rise of RPA is a significant advance in process automation and was considered the "fastest-growing software sub-segment" by the IT market research firm Gartner in 2018 (Gartner, 2021). RPA is constrained in that, many of the procedures needed to properly deploy it fall outside its purview. This comprises acquiring the information required for automation adoption, dealing with abnormalities during an automated process execution, and administering a process automation on an organisational level (K¨onig *et al.,* 2020:145). According to Anagnoste, (2017:685), RPA is not subject to any regulations, nor is it a framework of governance. This may be overcome by merging RPA with BPM (K¨onig *et al.,* 2020:145).

Van der Aalst *et al*. (2018:269) find that more vendors selling BPM have included RPA capabilities in their software. The methodologies required to carry out a successful RPA project may be built into the BPM lifecycle, as RPA is an extension of the automation phase of business operations. The lifecycle provides an adaptive approach to implementing BPM at the business process level. While the specific phases vary depending on the source, the associated actions and their order remain consistent (K¨onig *et al*., 2020:134). The same process BPM lifecycle might be advantageous for an RPA project to provide a clear path of governance. Figure 3.5 depicts the business process lifecycle as explained.

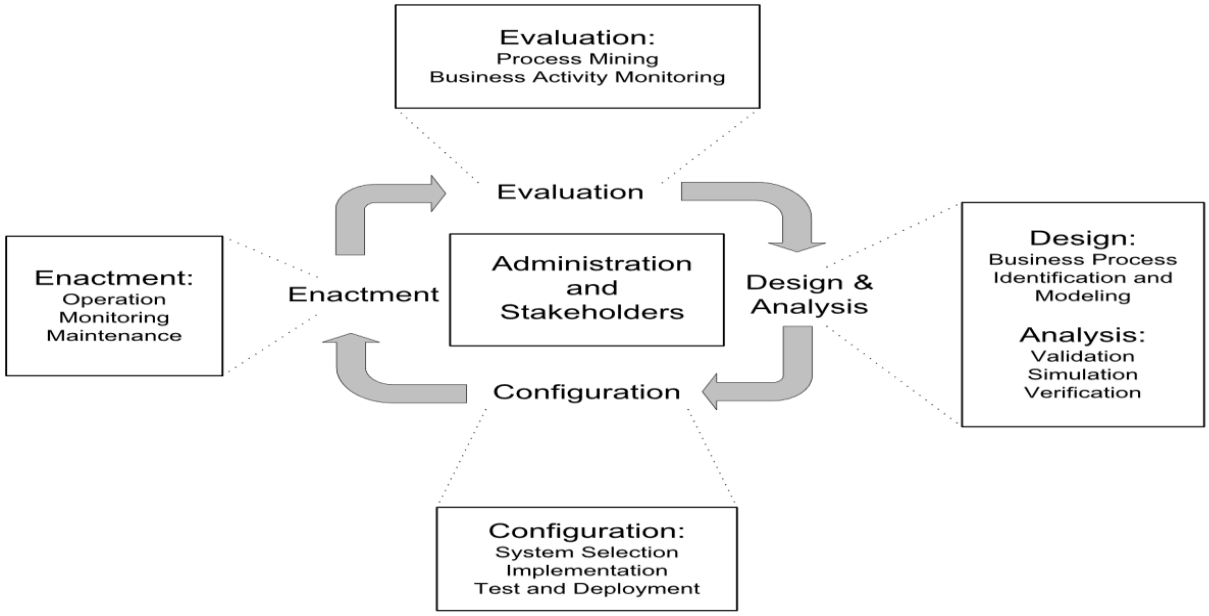


Figure 3.5: Business Process Lifecycle (Source: K¨onig *et al.,* 2020:133)

K¨onig *et al*.'s (2020:135) findings suggest that RPA is carried out through Robotic Process Automation Systems (RPAS), the basic framework of an RPAS is like that of Business Process Management Solutions (BPMS) which is an enabler of BPM. BPMS is a collection of technologies that enable the

model-driven enactment and operation of business processes. It includes a business process simulation model that allows a process designer to model, configure and deploy business processes, a process generator that implements the process models with the help of external applications; it also includes a desktop application that allows project members to operate and regulate implementation (K¨onig *et al*., 2020:135).

As key aspects of the BPM infrastructure, process miners and other supplementary tools for analysis and assessment are frequently included with BPM systems. A business process management system (BPMS) enables the automation of business processes by assigning the execution of specified activities to software using APIs such as UiPath software. Process automation, resource management, performance monitoring, supervision, and process modelling are also supported (K¨onig *et al*., 2020:140).

Willcocks *et al.* (2015:5) describe RPA as a software solution, citing, although the phrase RPA conjures up images of real robots roaming around businesses completing human activities, RPA robots are not visibly tangible. However, a robot in RPA parlance is comparable to one software license that is integrated into an existing infrastructure (Willcocks *et al.,* (2015:5). In business processes, the phrase RPA refers to configuring software to the user interface (presentation layer) to accomplish work that is done by people (K¨onig *et al.,* 2020:133). BPM on contrast is configured at the back end (business logic and data access layers) of the system where data is stored. Figure 3.6 below shows the difference on configuration of RPA and BPM to the existing organisational database.

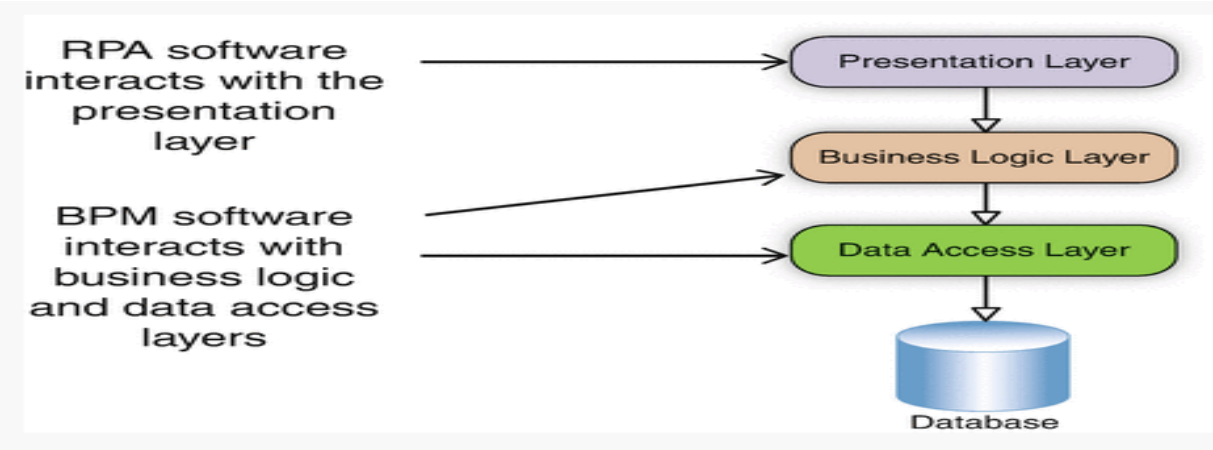


Figure 3.6: RPA and BPM Configuration (Source: Lacity & Willcocks, 2018:273)

Extensive process understanding is necessary to identify and implement an RPA process (K¨onig *et al*., 2020:136). RPA incorporation with BPM can help to overcome RPA restrictions and give the process expertise needed for a successful RPA implementation. RPA may be adopted more readily in organisations, especially when BPM infrastructure and knowledge are already in place (K¨onig *et al*., 2020:137). K¨onig *et al*. (2020:144) caution that RPA robots emulating people can begin making wrong judgments because of contextual changes. This might go undiscovered for some time, resulting in perilous scenarios. When RPA agents imitate individuals, there are additional ethical and security concerns, hence the need for the collaboration of the two systems (K¨onig *et al*., 2020:144).

Key to accomplishing organisational strategic governance objectives in RPA projects and avoiding rogue robots is to properly integrate RPA with BPMS that incorporates process governance (Willcocks *et al.,* 2015:12). To support the investment in IT development, BPMS solutions can be implemented employing IT resources for specialised, higher-value activities. For lower-value and more generic procedures, RPA systems can be deployed by business operations employees with IT management (but not by IT developers); automating in this manner is financially advantageous at substantially lower IT capital costs. The process value and level of specialisation, as shown in Figure 3.7, may also be used to compare and integrate BPMS with RPA.

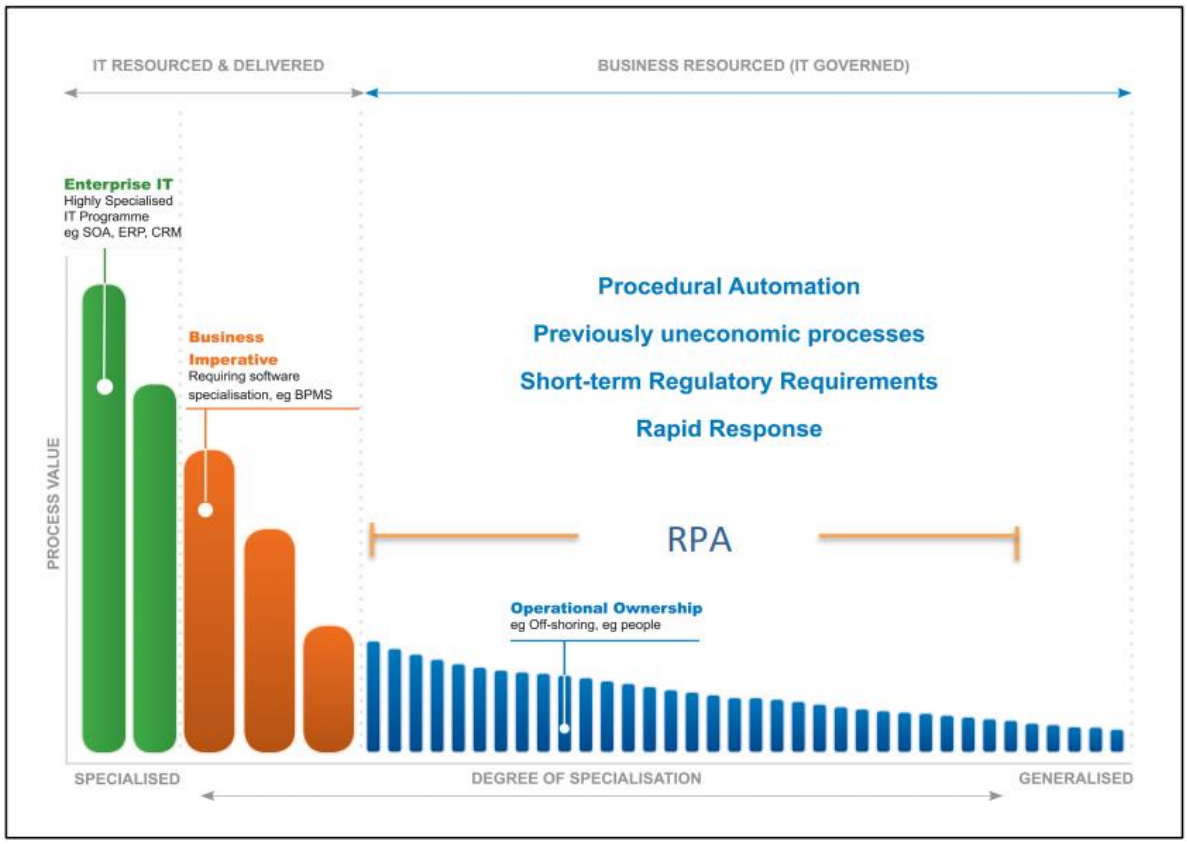


Figure 3.7: BPMS versus RPA (Source: Willcocks *et al.,* 2015:12)

3.2.4 UiPath Application Software and IT Governance

The UiPath Platform provides robust governance features, UiPath software considers compliance by integrating into processes and behaviour of its robots (UiPath, 2021a). Employees and partners (customers, resellers, agents, and suppliers) associated with the software are mandated to act in compliance with applicable legislations governing software usage and the UiPath Code of Conduct on contracting (UiPath, 2021a). Gartner (2021) observed UiPath as a leader in their 2021 magic quadrant, emphasising it as an RPA platform, that offers rich governance features; it is also deemed a citizen-developer-friendly customer experience (UX), enhanced computer vision and cloud-orchestrated RPA as a service that complies with software regulations.

According to the UiPath (2021a), UiPath software maintains an ISO/IEC 27001:2013 certification that covers core product lines and main development locations. This attests to UiPath sustaining and refining an information technology security that protects confidential information collected, processed by their robots. The UiPath governance certification subscription covers processes affected during the product development and maintenance lifecycle, covering the analysis, design, development and delivery by UiPath on the customer premise as a service provider (UiPath, 2021a).

The ISO/IEC 27001 framework specifies information security management policy that is suited to the organisation's peculiarities, with a specific framework for creating objectives and assessing effectiveness (ISO/IEC 27001). UiPath software has embedded a risk assessment strategy responsible for detecting, analysing, assessing possible threats and creating controls to mitigate these risks (UiPath, 2021a). However, UiPath allows organisations to create unique statement of adaptability that details the controls and governance, and how they will be implemented by using UiPath robots. The UiPath platform does not store, transmit, or process sensitive data outside the customer's network/ infrastructure (UiPath, 2021a). It can be used as the foundation to create Payment Card Industry Data Security Standard (PCI-DSS) and Sarbanes-Oxley Act of 2002 (SOX) compliant automated processes. Organisations' developers and compliance team are responsible for ensuring that any developed automation follows the relevant regulatory recommendations provided by UiPath, coupled with own customisation (UiPath, 2021a).

Automations that are vital to corporate operations should be kept in secure locations. Thus, UiPath uses UiPath orchestrator to version the authorised processes, as well as a subversion (SVN) system to guarantee that automations are properly versioned (that is up to date) (UiPath, 2021a). UiPath provides an opportunity each time an automation is changed, a consistent approval, update, and versioning process should be followed (UiPath, 2021a). According to the UiPath (2021a), to guarantee that users conform to development standards and follow regulations, businesses can impose governance policies that restrict the functions of solutions in one of the following ways:

- Use UiPath automation operations to build and operate policies. This is an easy-to-use online application included in automation cloud.
- Implement a file-based governance approach, which entails building a JavaScript Object Notation (JSON) policy file and delivering it locally, externally, or through an orchestrator.

Governance policies can be enforced in UiPath using automation ops. This is a web application available in automation cloud that allows administrators to quickly set up and deploy policies in the organisations (UiPath, 2021a). As an alternative, a file-based governance model that consists of creating a text file in JavaScript Object Notation Format (JSON) and deploying it by a registry key or through orchestrator can be used. This file is placed in a read-only location accessible from organisation users' machines, such as a network share or a blob storage. A registry key is then set either through an install script or a Windows group policy. Alternatively, the contents of the file can be pasted or added to the file path in specific assets in orchestrator. The Studio loads the policy when it starts and behaves as defined by the policy. An application or an address of a website known as a Uniform Resource

Locater (URL) configuration and restrictions rule can be done using either the prohibited or allowed lists per organisation's requirements and set the default action to an error (UiPath, 2021a).

The UiPath (2021a) states that to impose a governance policy standard set by an organisation during UiPath installation, IT employees can initiate and introduce a governance file using one of the Studio's functions, then configure the file with the specific parameters, and apply the policy in one of the following ways:

- **Utilising a native file (for training)** - Putting the regulation file in the travelling folder on the computer where the application is deployed.
- **Utilising an alternate option (for big installations)** - Placing the governance file at a location (for example, hypertext transfer protocol/secure (HTTP/HTTPS server) specified by a configuration file or an event processing asset.
- **Utilising a resource in orchestrator** - Transferring the information of the regulation file to an orchestrator asset.

The starting phase in imposing standards and guidelines in organisations is to build a governance file using one of UiPath services, such as Studio, or to manually create a comparable file that incorporates all or some of the features stated above (UiPath, 2021f).

3.2.5 Governance Controls in UiPath

K¨onig *et al*. (2020:136) observed organisations for having to deploying appropriate policies and procedures to ensure compliance with internal IT governance requirements when automating business-critical processes with RPA technology. To enable organisations to provide UiPath solutions to a broad group of users securely in a controlled and managed manner, particularly at a customer contact centre, the Studio platform is offered by UiPath; the platform has built-in automatic logging and controls that can enforce organisational policies (UiPath, 2021f).

According to UiPath (2021f), it is vital to record, what, how, which and who is using automations in the organisation for better governance over an acquired RPA software. Such an operation enables organisations to build reports from the data registry audit rail (user and machine information, direct queries against the logs, information in the execution logs and platform insights) (UiPath, 2021a). By logging all user and process information in the execution logs, contact centres can build reports and know who is running which automations. In this way, they enact organisational policies to ensure that all automations shared with IT are properly documented and understood. Any situations where employees build unauthorised automations could thus be avoided (UiPath, 2021f).

By default, activities used by the Studio projects record important information in the execution logs with no action required from the user (UiPath, 2021f), giving a high-level picture of important actions performed by the robot. Every event to be executed, started in the execution logs is initiated by a recorder that records which product started the automation (Assistant, Studio, or Orchestrator). This means that organisations' management through privileged access can build a report from the logs showing who is using which product and detect patterns such as users running only from the Studio,

rather than publishing completed processes (UiPath, 2021f). In Figure 3.8, UiPath platform on which Studio is hosted, compliance pillars and their interrelations are shown.

Further, the UiPath (2021f) states that many organisations should have guardrails to ensure that citizen developers follow organisational policies and guidelines. As such, the UiPath studio can specify policies that control areas such as:

- Settings (Workflow Analyzer);
- Permitted activities package feeds;
- Permitted activities and packages and Applications and URLs that can be automated.

3.2.5.1 Different stages of control in UiPath

When automating controlled or business-critical activities with RPA technology, organisations should implement proper rules and guidelines to guarantee compliance with internal IT regulations. When using RPA to automate crucial business activities, four key areas should be prioritised throughout the process lifetime. These include process management, process development, back-up (disaster recovery) and application platform (UiPath, 2021f). The four key areas with data security as an underlying element for their performance as expected are illustrated in Figure 3.8 below.

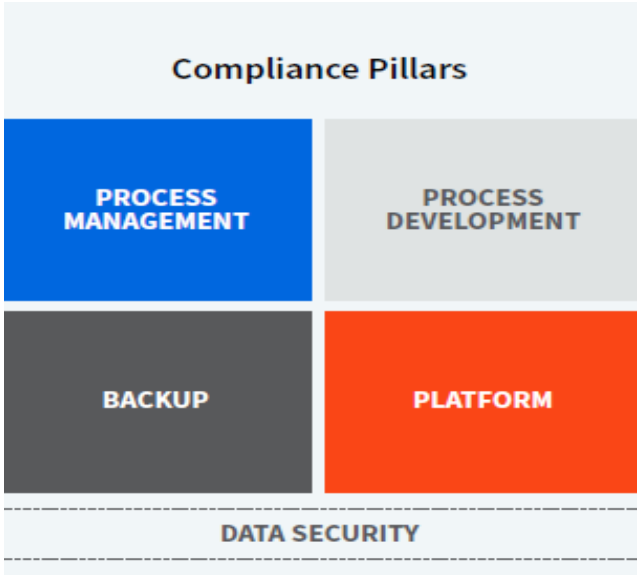


Figure 3.8: RPA IT Compliance (Source: UiPath, 2021f)

The different phases to RPA compliance illustrated in Figure 3.8 above are expanded as follows:

Process Management: This relates to all the controls to be considered in the new automated process by the organisation. A robot should be provisioned access just like a normal user. Their access should be audited and given minimum privileges based on the job they are performing. If the Robot's job requires highly privileged accounts, the access should be audited just like a human. In what follows are the key areas:

- Control identification
- Process ownership

- Role/access management
- Segregation of duties
- Governance

Process Development: This incorporates all the security related to the actual development of robots. Developing compliant automation of controlled processes requires adopting similar best practices to those used for developing business-critical software systems. This is just as important as the controls put in place for software development programs involving the following areas:

- Code quality
- Incident management
- Code deployment
- Logging
- Change management
- Test case completeness
- Process deployment

Platform: A secure platform is extremely critical to the compliant operation of robots, especially those automating critical processes. UiPath ensures the security of our platform and all the controls related to this environment. This includes the following areas:

- Transmission of data in UiPath
- Password storage
- Infrastructure security

Backup: A contingency plan for disaster recovery ensures that critical controlled processes can be maintained also being required for compliance with some regulations. Any unplanned downtime is an issue, but this is especially true for critical systems and processes, back-up, therefore becomes critical. When considering disaster recovery, the RPA platform should be treated as a critical part of the supply chain. There should be a back-up infrastructure and an offline process if need be. This includes the following areas:

- Disaster Recovery (DR) strategy

Data Security: Data security is a crucial for the compliant automation of business-critical processes. The UiPath platform does not store transactional information in the process. For example, if the organisation is using the platform to update an ERP system with a value obtained from Salesforce, UiPath will not store that value unless explicitly required to.

3.2.5.2 UiPath Lifecycle control

The UiPath (2021f) notes that control and compliance should be exercised at all stages of UiPath usage. Figure 3.9 depicts the stages of UiPath lifecycle, with their interactions colour-coded to signify

interdependency.

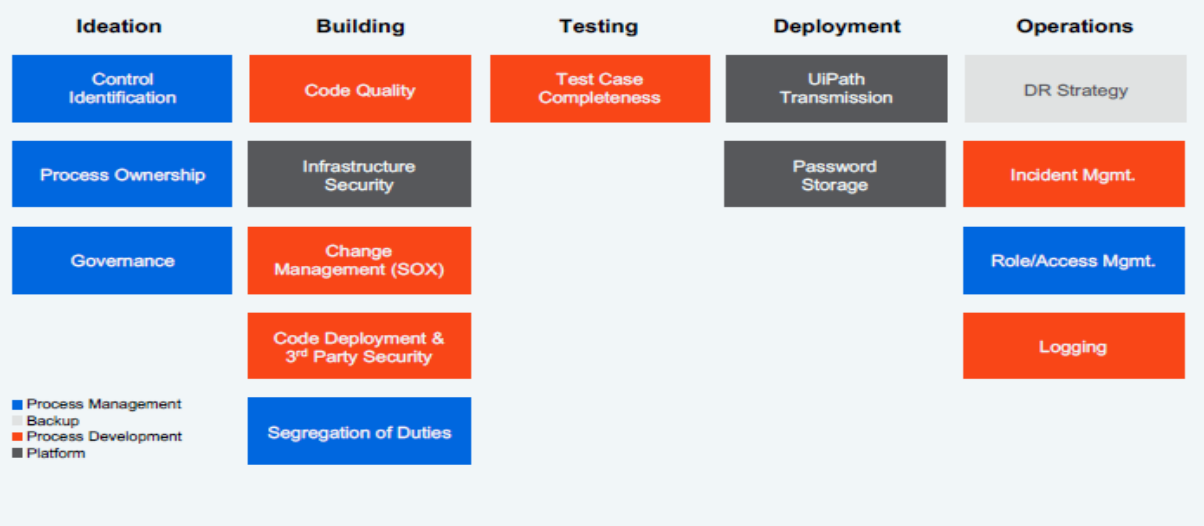


Figure 3.9: Compliance Throughout the Development Lifecycle (Source: UiPath, 2021f)

The control mechanisms as explained in the automation development lifecycle of robots as documented by UiPath (2021f):

- **Ideation:** This is where control points in the new automated process are identified. However, they might not be the same controls as originally implemented in the manual process. For example, a process that automates email management reconciliation might not need a managerial review, but it would still need a review of any errors or issues surfaced by the automation.
- **Building:** When developing automations, the quality of design and coding standards are critical. Without clear definition of the digital standard operating procedures, the automated process might break down. To ensure that the right quality of code is available, segregating duties, and implementing effective change management procedures are also critical.
- **Testing:** Testing the automation confirms that the process was critically analysed and implemented correctly. It is important to test all cases to make sure all possible deviations are validated.
- **Deployment:** When deploying the automation, assurance that the correct and tested version is put into production is considered.
- **Operations:** It is critical to have the right level of operations around automations to help to ensure compliance. Issues can arise due to application availability, changes in process and other variables. These potential issues can be mitigated with a certain operational view of automations.

3.3 Conclusion

This chapter has established IT governance as a recognised pathway leader for governance of information technology. The RPA technology falling within the circle of information technology, should

be aligned with requirements of existing IT governance, legacy systems to enable easy integration and follow precedence regarding governance of software packages to ensure or prioritise protection of information (data) that is processed by RPA applications. This information is the most important asset of the business. Additionally, considerable knowledge of process management is essential for the realisation of RPA value and proper positioning and regulatory compliance in an organisation. Lastly, stakeholders should be involved in the acquisitions process, and communication regarding the RPA solution should be clearly defined and properly dispersed to enable combined assurance on the RPA governance.

4 CHAPTER FOUR
IT-BUSINESS MISALIGNMENT AND IMPLEMENTATION OF RPA

4.1 Introduction

In this chapter, misalignment between IT strategies and business strategies are discussed. This chapter examines ways in which these misalignments can affect the effective and efficient IT operations of configuration, maintenance, and decommissioning of any adopted RPA software application implementation. The chapter also describes the limitations of the application at the implementation stage, how to overcome the challenges to ensure full optimisation of the package and how proper implementation can assist with management of misalignment.

4.2 Misalignment between IT strategies and business strategies

For decades, one of the primary concerns of practitioners and academics has been the alignment of information technology strategy with business strategy (Yayla & Hu, 2012). Alignment has been explored from different angles, with academics considering the extent to which IT replicates business management (Osmundsen *et al*., 2019:6924).

Alignment concerns the degree to which the business strategy's mission, objectives and plans are shared and reinforced by the IT strategy. It denotes the fit and integration between business strategy, IT strategy, business infrastructure and IT infrastructure (Osmundsen *et al*., 2019:6924). Strategic alignment of IT occurs when the organisation's goals and operations, as well as the information systems that support them synchronise. An effective alignment views the organisation as applying suitable IT strategies timely in given conditions. Furthermore, such actions remain consistent with the business approach, objectives and requirements (Chan & Reich, 2007). Figure 4.1 depicts the collaboration between stakeholders in organisations that enable successful implementation of an RPA project.

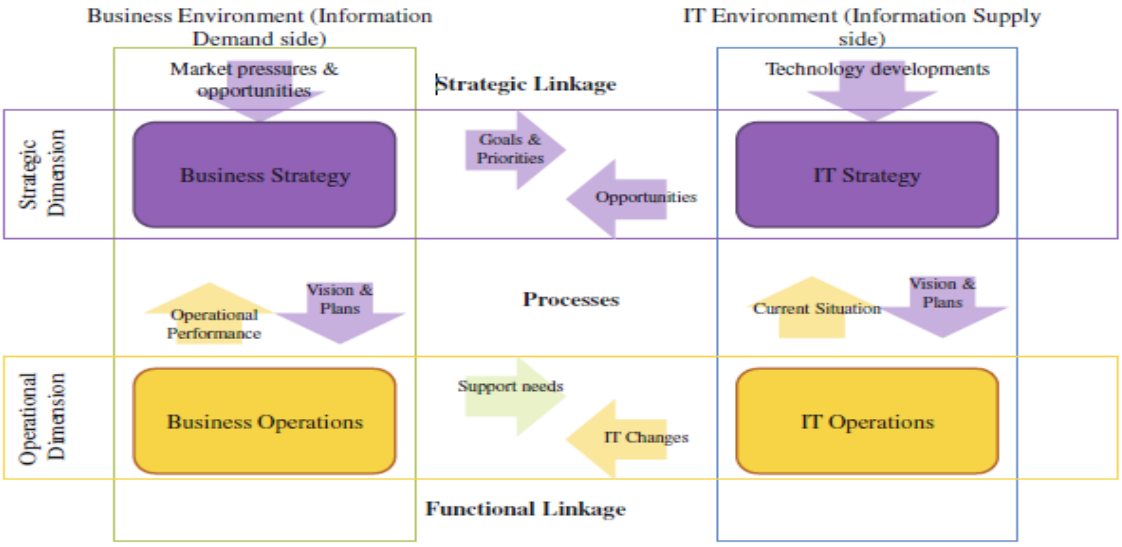


Figure 4.1: Business and IT Alignment (Source: Gómez *et al.*, 2017:136)

As shown in Figure 4.1, IT environment is one of the important variables in organisational competitiveness and operations. Also involved are procedures, expenditures, expenses, and the firm's competence to deliver technical services. As a result, firms rely on IT and can integrate IT resources into other organisational and managerial activities. As depicted in Figure 4.1 organisations' IT management strategy has moved from an operational support position to a more strategic role incorporating issues such as business transformation, innovation (through analysis of current situations), and gaining IT-based commercial possibilities requiring combined assurance for successful implementation of acquired technology process management more than before (Chan & Reich, 2007).

IT competency and IT flexibility are the most essential aspects prompting the strategic alignment of business and information technology (Mohamad & Toomey, 2016:15). IT competency is intimately tied to the long-term effects of senior management actions, while critical IT decisions were previously delegated to the company's IT specialists by board-level executives. This could not assure the best interests of all stakeholders unless all stakeholders took a meaningful action (Mohamad & Toomey, 2016:15). Currently everyone is involved in IT governance and operations as shown in Figure 4.1, including board members and top management through business strategy, personnel through business operations and processes, and customers by imposing market on the business. It creates the structure for the organisation to follow and promote transparent responsibility of individual decisions and to ensure the accountability of actions, assigned roles and misalignment rectification (Mohamad & Toomey, 2016:5).

An appropriate alignment allows businesses to better understand their own processes, thereby quickly inducting RPA robots, as well as contributing largely to monitoring the automation results (Rutaganda *et al.,* 2017:110). The heads of business operations should be held accountable for creating the Key Performance Indicators (KPIs) of selected RPA use cases. IT, on the other hand, should collaborate with business stakeholders to employ a triage approach to choosing the best use cases for an early proof of concept, establish RPA technical infrastructure, and set the groundwork for an RPA centre of excellence (Rutaganda *et al.,* 2017:110). To efficiently control RPA programs and make crucial choices, IT and the business should collaborate (Rutaganda *et al.,* 2017:110).

4.2.1 Challenges in Attaining Alignment of IT and Business Operations

Organisations must subscribe to change to be effectively allowing the business operations to manage risk openly and achieve outcomes that are aligned with business strategic goals and objectives (Mueller *et al.,* 2008:46). The deployment of a newly acquired technology like RPA influences all levels of the organisation. Change brought about by the acquired technology solution n impacts on everyone from top executives to new employees, and from the most strategically oriented business units to the aids that enable technology for the company (Mueller *et al.,* 2008:46).

Misalignment is frequently blamed for system implementation issues. Even though a strategy is carried out on the front lines, formal strategies are frequently adopted exclusively at the highest levels of companies (Chan & Reich, 2007). At the lowest levels of a company, the focus of alignment is on turning the business unit goals into personal goals. In project alignment, IT is the degree to which the outcomes

of an IT project are consistent with the organisation's IT strategies and the project's objectives (Chan & Reich, 2007). The project's response to change triggers is critical to project consistency. Such causes may come from different business levels, and may halt alignment of IT and business, as shown in Table 4.1 below.

The inability to adequately respond to change triggers undesired results in project implementation (Chan & Reich, 2007). Misalignment in technology projects like RPA can cascade upwards, resulting in overall IT and business strategy misalignment. At an operational alignment, it is a shared cognition between business and IT leaders at the most micro-level. The more the cognitive similarity between business and IT leaders, the greater the amount of IT–business alignment. Similarly, the higher the predicted levels of alignment, the greater the variation in the cognitive structure and content of business and IT leaders (Chan & Reich, 2007). Table 4.1 highlights the different challenges facing different levels of an organisational hierarchy.

Table 4.1: Challenges for Information Technology Projects (RPA) Implementation

Business Level	**Challenges**
Level of business operations and administrations	• A sense of heightened control and evaluation • A need for extra employees to manage the solution • Organisational structure changes
Level of the project	• Additional documentation and trainings. • Adaptive approach to completing actions rather than sequential or unstructured approaches • Preparing details that grow over the life cycle rather than performing all planning at the start
Individual's level	• New responsibilities. • New capabilities • Concerns about job security.

(Source: Mueller *et al.,* 2008:43)

According to Willcocks *et al*. (2015:15), business processes are the most prevalent adoption points across the case studies in their research for RPA projects, because business operations found value in owning and running the service automation capacity. IT had to be brought in to guarantee that an acquired software complied with IT policies to assist business operations in scaling the IT infrastructure as automation increased Willcocks *et al*., (2015:24). For Chan and Reich (2007), once the IT teams realise how the acquired technology operates, they, too, recognise the potential in letting business operations handle automation requests on their own, allowing IT to focus on more technically challenging initiatives.

Chan and Reich (2007) further offer several variables that hinder the successful implementation of acquired applications to achieve IT and business strategy alignment. For them, these complications are associated with knowledge, perceived control and organisational transformation as explained below:

1. **Knowledge-related alignment difficulties:** Knowledge-related alignment challenges refers to the primary issue that IT managers are not always aware of company strategy, nor are organisational leaders always educated on how IT functions. Neither do executives always know crucial company and industry factors. It is therefore imperative that IT leaders are conversant with business objectives about automations like UiPath, understanding what it brings.
2. **Unknown company strategy:** A common issue with the past alignment studies was that organisational stratagem is often unknown or, if recognised, is ambiguous and problematic to for many users. This is a substantial difficulty since most alignment models assume an existing business plan with which IT may align itself. Formal company plans are sometimes too unclear for managers; managers are confronted with uncertainty regarding the distinctions between stated strategies, strategies in practice and managerial behaviour, many of which may clash with one another. This interpretation problem occurs both within and outside the IT company, connections, common domains of knowledge, and shared systems of meaning impact on internal understanding. Education and training, an organisational structure, and visibility of IT employees inside the structure, and the IT environment all affect external interpretation. Poor alignment regarding an unknown company strategy may come from failures or deficiencies in any of the following areas:
    - **Deficiency of understanding and confidence in the importance of alignment:** Company executives may be ignorant of the significance of IT alignment and/or have little faith that IT can address critical business challenges. The effect of attitudes on IT alignment awareness is considerable and worth monitoring.
    - **Deficiency of industry and business understanding:** Lack of information about the industry an organisation operates in (not only skills and knowledge about IT) among management hampers IT alignment. IT alignment is negatively affected by industry characteristics, in particular: understanding of industry or sector difficulties, and management unfamiliar with the interplay of diverse parts within the corporate strategy. As a result, before managers could leverage IT solutions to assist address their business challenges, they need better understanding of business.
3. **Alignment issues relating to control elements and IT status:** When managers face business problems, they make judgments based on their position of understanding and their position of control, which is decision-making authority. These restrictions influence alignment as it further builds on non-mutual understating between IT and business.
4. **Organisational change-related alignment difficulties:** Because the business environment is continually transforming, there may be no such a thing as a state of alignment. Strategic decisions taken by an organisation are typically imitated by other organisations. As a result,

> strategic alignment is a constant process of transformation, evolution and adjusting. The fundamental issue with alignment is the time mismatch between business and IT planning processes. Since the business environment and technology change so fast; once an IT plan is implemented, both the plan and the technology are likely to be outdated.

The emphasis on the organisation's IT management has shifted from providing technology to support internal procedures to a more strategic role in business transformation, innovation and the generation of IT-based business possibilities. It is, therefore, imperative for organisations to build strategic IT capabilities and IT alignment capabilities from a resource-based perspective, particularly a capability-based perspective. As such, the organisations' strategic IT direction should follow the organisation's common understanding of the function of IT (Chan & Reich, 2007). These techniques guarantee individuals power and information needed for making right choices at the right time (Mueller *et al.,* 2008:43) According to Tallon (2009), certain crucial characteristics, such as IT flexibility and IT competency are required for preserving strategic alignment.

For Osmundsen (2019:6922), organising RPA outside the IT function requires a distributed approach to building up aptitude and abilities in the organisation of personnel, allowing the business units to construct the robots themselves. It is important to include employees who work with processes daily; such an engagement of employees increases employees' understanding of the processes in which they participate as well as their own work routines and responsibilities regarding RPA (Osmundsen, 2019:6922). The RPA projects need an on-going mapping of and understanding of organisational business processes, allowing employees to consider their operations to enhance their daily routines. Osmundsen (2019:6922) highlights issues related to the disengagement of IT and business as the interconnected parties in executing technology projects like RPA, namely:

Inadequate control systems: One of the major obstacles to retaining RPA activities inside local business units is lack of control mechanisms to manage and prioritise various RPA initiatives. Inconsistency in the fundamental control, allowing for local RPA projects will eventually result in too many distinct initiatives running concurrently, causing businesses to lose sight of the initiatives and automation of processes that are not suitable. Business units primarily involved in RPA projects put strain on resources and capabilities in the business units, several workers involved in RPA initiatives in organisations must attend to RPA on top of their regular duties. Employees should prioritise their time independently, without any central governance systems; everyday operations deteriorate because of such prioritisation. As the volume and complexity of RPA programs grow, the RPA experts become restricted.

Inadequate end-to-end process visibility: RPA projects began and developed inside departments without the assistance of the IT department, and without a comprehensive view of how processes feature and influence other sections of the company, generating challenges. It is critical to take a rounded view of an organisation's processes, and the emphasis should be on adopting RPA enterprise-wide processes rather than on sub-processes to enable end-to-end processes in the organisation.

Despite the challenges of attaining alignment, there are important achievements for integrating IT goals into business objectives that have been identified by Chan and Reich (2007) as shown in Table 4.2 below:

Table 4.2: Ways to Attain Alignment in Business and IT Operations

Business Operations	IT Operations
Senior leaders should take responsibility to the strategic practice of information technology.	IT leaderships' familiarity of business senior management and business imperatives.
Senior leaders trust the IT department.	IT management should know the business goals and objectives.
Business knowledge of IT administration.	IT management has access to the corporate business strategy.
Regular interaction amongst end users and IT teams.	The IT department's ability to discover innovative methods to employ IT strategically within the business
Collaboration between business and IT leaders to prioritise application development.	IT personnel keep up with technological developments, the effectiveness and dependability of the IT department. IT department that is attentive to user requirements.

(Source: Chan & Reich, 2007)

According to Lacity and Willcocks (2018:292), for RPA projects, the best alignment outcomes occur along with a general organisational automation plan in place. An automation plan specifies the organisation's continuing objectives as well as how service automation fits into the bigger picture of organisational revolution into digitalisation. Additionally, Lacity and Willcocks (2018:304) identify the principles for an efficient service automation plan that resulted from their survey and interviews as:

- Involving strategic service automation which necessitates cultural change in hierarchy (everyone in the organisation on operational, tactical, and strategic level);
- Providing various advantages and disadvantages in business cases for service automation projects as predicted;
- Recognising hype and factual solutions and acting on well-researched solutions.
- Correcting knowledge that services automation, which is just a continuum of multiple tools and platforms suited to various duties both in IT operations and business operations, though providing solutions for automated projects.

Lacity and Willcocks (2018:292) refer to the following as advantages of an aligned IT-business strategy in automation that is effectively aligned:

- Savings on full-time employees (FTEs) lowered total service costs. An around-the-clock service coverage without any shift personnel since service automation tools do not sleep nor eat.
- A versatile virtual workforce due to the ability of software robots to be multi-skilled;

- Consistent quality since robots in software do not commit errors;
- Greater compliance since software robots are programmed to obey if all rules and processes are documented and therefore easily inspected by auditors;
- Service delivery is faster because application package is quicker than people;
- Quicker implementation of innovative features since service automation technologies are easier to implement than other IT offerings;
- Extremely flexible systems to match spikes in requests;
- Increased employee fulfilment since dull jobs are handled by software, enabling staff to focus on activities in need of decision-making, understanding and common interactions.

To properly onboard the virtual workforce, the organisation should comprehend IT infrastructure, IT security, architecture, risk and compliance, people or human capital activities, finance and any other critical business operations (Rutaganda, Bergstrom, Jayashekhar, Jayasinghe & Ahmed, 2017:110). A successful RPA program should be driven by the business rather than by IT, as all successful RPA programs have been found to have one thing in common, allowing the business to lead and use IT as a powerful assistant and collaborator (Rutaganda *et al.,* 2017:110).

Figure 4.2 below illustrates the alignment between business and IT in acquiring an automation service. Appropriate alignment levels ensure that automated services like UiPath in organisations with CCCs can be successful with the support within the organisation. As Lacity and Willcocks, (2018:304) highlight, organisations frequently misjudge the change management needs for service automation. Service automation (in this study, customer contact centre emails management automation) requires a sponsor and a project advocate, just like any other organizational change. Correspondingly, organisations should delegate leadership of the service automation program to business operations. Business operations, on the other hand, should have IT on board early and adhere to the technology function's governance and architectural principles. Organisations should also pay close attention to internal communications to ensure that employees understand what to anticipate, without panicking or undermining the automation program (Lacity & Willcocks, 2018:304).

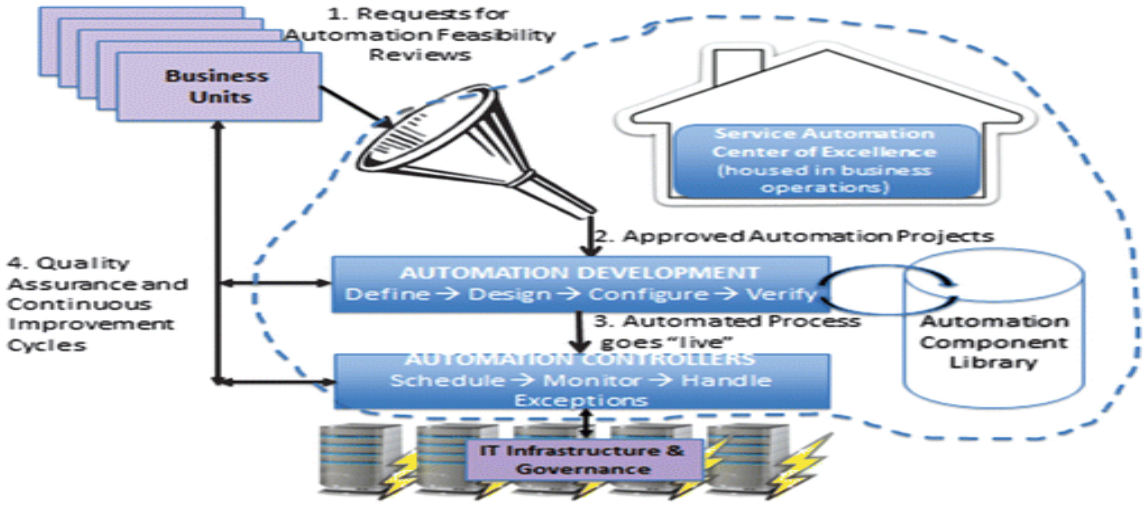


Figure 4.2: Mature Service Automation Operating Model (Source: Lacity & Willcocks, 2018:308)

Although there are numerous approaches to managing a service automation capacity, establishing a Centre of Excellence (CoE) that serves as a shared corporate resource has been found to be the best practice (Lacity & Willcocks, 2018:307). Staffing a CoE necessitates a rethinking of talent management and the skills required for business automation. A robust service automation capacity is always on the lookout for new information; it features several feedback mechanisms that improve the capability over time. As a CoE continues to collaborate with business units to possibly automate additional functionality of a live process, the initial feedback loop continuously improves the automated processes. The second feedback loop boosts the CoE's productivity by adding and removing reusable components from an automation library and by using multi-skilled robots that are never idle (Lacity & Willcocks, 2018:307).

4.3 IT- business Misalignment Issues Relating to the Adoption of RPA Technology Software

Bridging the business-IT gap is one of the most difficult tasks for IT and business personnel. To achieve the objective of organisations staying competitive in its operations, information technology is crucial (Syed *et al.,* 2020:24; Martens, 2013). UiPath also affirms that the most common mistake in acquiring RPA is not to involve the IT department (UiPath, 2021e). RPA is often introduced to an organisation at the business level (operational level), offering automating procedures that are simple tasks for workforce with no technical experience (Willcocks *et al.,* 2015:5). This can lead to a division, and worse, distress among the IT staff (technical level) (Willcocks *et al.,* 2015:5).

RPA application software is not different from a traditional IT software package, and it relies on being able to seamlessly integrate into the existing IT infrastructure (Zhang & Liu, 2019:27). Engaging from the beginning with the IT team is the best way to develop a strong and mutually beneficial relationship regarding RPA. IT assists with prioritising processes as they know which systems stable and which ones are about to be upgraded. Equally important is that the IT team has all the deployment, security, and governance experience of an enterprise technology roll-out to help successfully scale the RPA program across the organisation (Zhang & Liu, 2019:27).

Gartner (2019) states that two core problems organisations face in their robotics journey are:

- **Analysis paralysis:** Organisations often tend to overthink the benefits and costs of implementing robotics, thus missing immediate opportunities to support the enterprise and engage relevant operations teams.
- **Static governance frameworks:** The old, one-size-fits-all governance and operational processes are ill-suited to the growing diversity of the robotics portfolio, though not requiring rapid RPA implementation.

Zhang and Liu (2019:27) confirm that organisations can derive better returns on investment from their automation investments when the senior management team and IT are fully behind the automation effort working collectively. A strategic roadmap that allows the business to start small and rapidly scale is also key to successful RPA implementation, with building the institutional structures and capability needed for effective stewardship and execution of the automation strategy being vital. Gartner (2019) affirms that change management and support for the human workforce are also essential for success.

Structure sustenance is necessary for the setup of RPA robots' physical and virtual servers (Willcocks *et al.,* 2015:4). IT Infrastructure guarantees that the RPA platform works on flexible and regulated complying infrastructure, that has databases and servers that are supported, enabling RPA to function like other organisational system services, hence the need for management to acknowledge IT and its governance as enablers for RPA functionalities (Willcocks *et al.,* 2015:23). Compliance is also important in RPA initiatives; the attained software robots' output data should be protected for conformity to regulatory metrics in a preferred format used if needed. Alignment of business and IT ensure compliance of RPA, thereby implying that the solutions are designed and used in accordance with statutory requirements; that security is adequate, and that data is stored securely (Zhang & Liu, 2019:27).

UiPath (2021e) has developed a maturity model of a three-stage automation journey, to help organizations to successfully move from an initial pilot to organisation-wide deployment of RPA technology and its applications incorporation. Such development could ensure that every stakeholder from both operational and technical levels in organisations are involved and aligned with RPA adoption, usage, and governance. The three stages developed are:

- **Getting started**

This stage takes an organisation from its initial RPA pilot project to rolling out its first productive automation across a specific business function or an individual department. It establishes how to prepare for RPA automation, selecting the right RPA technology platform, how to implement the management structures and controls, and raising awareness throughout the organisation.

- **Scaling across the enterprise**

Once the RPA team has established the value of automation to the organisation and demonstrated the benefits to be achieved with all stakeholders, including senior management, IT and employees, the organisation moves on to the next stage. In this stage, automation of the process continues in the initial function, but look to scale these automations across the enterprise. The beginning of identification of enterprise-wide processes that are prime for automation starts. While this stage focuses on driving an enterprise-wide operational excellence, it introduces automations that bring business transformation in areas such as customer experience, service delivery and business agility.

- **Transforming the business**

In the final stage, organisations concentrate on the transformative nature of RPA. Operational excellence is not abandoned, rather, transformation potential takes a centre stage. Central to this is the concept of a 'robot for every person' where every employee is empowered with their own individual digital assistant. Citizen developers and operations personnel are encouraged to develop and share automations that solve their daily business issues. This automation at every level of the business has the potential to transform how organisations operate and serve their customers. While the model is set out in a linear fashion, automation will unlikely ever take place like it does in practice.

Every organisation moves at its own pace, with some immediately delivering enterprise-wide automations, concentrating on one department or function. It is useful to view the model as developing layers of maturity where each stage is built upon and enhances the previous one. Two types of

alignment concerns should be addressed critically: strategic integration and operational integration. Strategic integration deals with business and IT strategy in relation to external factors while operational integration connects the infrastructure and processes of a business with IT infrastructure and procedures organised according to the internal domains they serve. Continuous review and monitoring of alignment is crucial to the achievement of business and IT strategies.

4.4 Overcoming misalignment issues through proper RPA implementation

When evaluating an organisation changes a management method and introduces an information technology implementation governance solution, they should consider the selection of participating projects (Mueller *et al.,* 2008:43). It is necessary to acknowledge the prospect of higher risk and skewed results if an IT governance solution affects just a fraction of interdependent projects that form a wider business endeavour. The implementation of an IT governance system should be co-ordinated with business initiatives rather than separate projects to ensure full optimisation of RPA (Mueller *et al.,* 2008:43). The following two crucial factors are deemed important for organisations in implanting the RPA projects (Mueller *et al.,* 2008:43):

1. **IT Governance Management**

Organisations impose limitations on business processes to reduce the possibility of project failure (Mueller *et al.,* 2008:44). These restrictions are frequently applied as a set of procedural controls that are likely to improve a product quality and compliance with regulations, standards and policies. They will also likely ensure that project contributions and accompanying efforts remain within the business' strategic objectives. IT governance management techniques based on the use of automated business process control points are required. In Figure 4.3 below, the quadrant of control is illustrated showing when and how controls can be effectively imposed in governing an RPA project to meet risks and process optimisation.

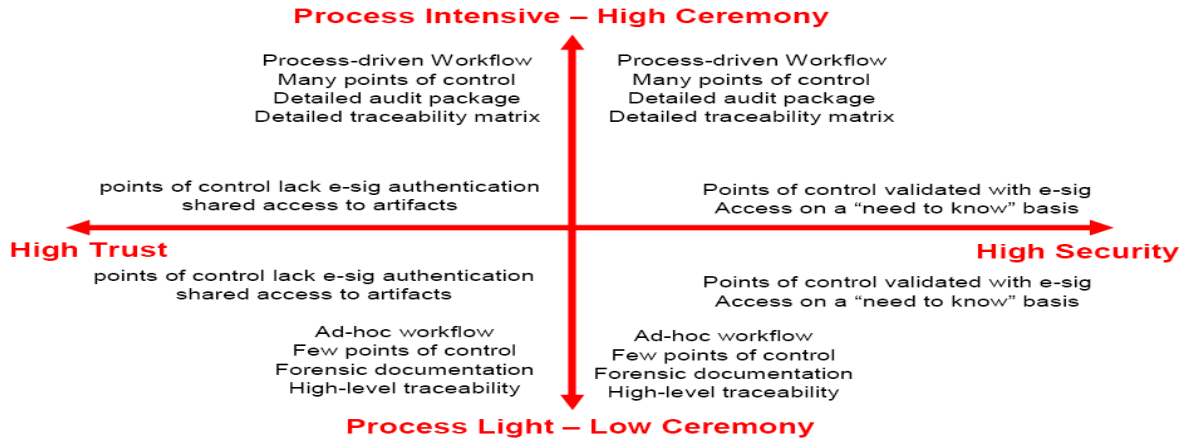


Figure 4.3: Control Quadrant – Establishment of the Different Governance Control Levels (Source: Mueller *et al.,* 2008:53)

When assessing the level of control that a business requires, organisations should strive towards establishing a set of continuous best practices across the organisation. They also should strive towards creating the required number of outcomes or working products as specified by a particular goal of monitoring and regulating standards. Two aspects influence the business easier to understand; first, implementing a uniform approach guarantees that certain key performance indicators may be shared for both lightly and heavily managed projects, organisational measurements for effectiveness, productivity and alignment with corporate goals can be compared. Second, uniformity allows greater flexibility in the allocation of resources within an organisation because the process is consistent; the organisation can readily move development resources from one project to another with little disturbance, thus contributing to the organisation's overall productivity (Mueller *et al.,* 2008:53).

Following an organisation's determination of which quadrant its control capabilities reside, the method to be used to handle a software development process or acquisition (in this research, the RPA UiPath acquisition process) in need of change needs to be determined. The five-step sequence of activities depicted in the Figure 4.4 below is one way to implement a compliant software development process.

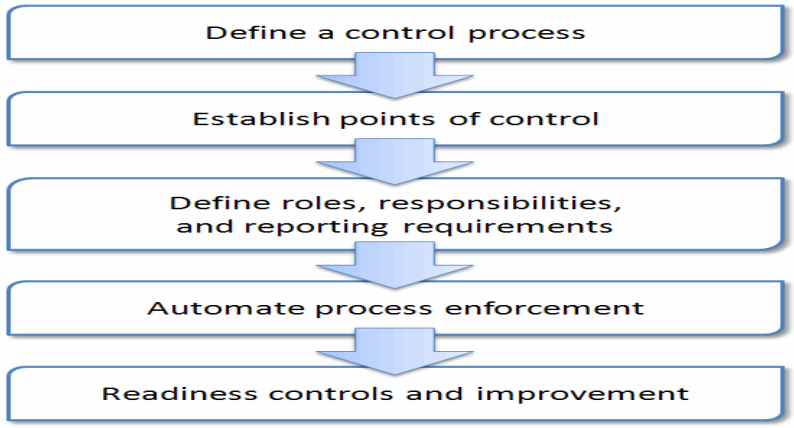


Figure 4.4: Practical control strategy elements (Source: Mueller *et al.,* 2008:54)

- **Define control procedure and establish points of control**

Control procedures should be clearly defined from the onset of the project acquisition, established, with their respective control points clarified. Accounting for the management of software product releases should be included in best practices for orchestrating software development/acquisition operations. This is followed by the demand for monitoring change control, which is related to deployments for planning, development or acquisition integration and deployment.

- **Define roles and responsibilities, and reporting requirements**

One of the techniques for selecting roles and responsibilities is to elevate and automate current routines. The roles for which implicit authorities are awarded are determined by organisational border crossing. Avoiding such circumstances should be recognised and included in the workflow. If the backup's activities are considered inadequate or improper, a thorough audit trail will be created. The use of existing documented procedures eliminates any further training while increasing the chance of

achievement by expediting process acceptance owing to reduced knowledge acquisition. Table 4.3 explains the roles, duties and responsibilities assigned to each member of the organisation involved in the RPA implementation.

Table 4.3: Roles and Responsibilities Control Strategy

Role	Description	Responsibility
Project manager	Co-ordinates and oversees release schedules from the point of request for modification to the point of dissemination. Also known as deployment lead.	Controls the release bundle. Generate required changes and allocates them to the relevant application teams. Authorises deployments to live environments as well.
Technical lead	Responsible for overseeing and guiding the establishment of system elements.	Guarantees that all set-up elements required for the system to work in a test or release environment are considered. Serves as the principal authoriser of changes. Generates and delegates changes management actions.
Integrator	Focuses on establishing all stages required to develop a usable system. Regulated builds are performed for one or more systems.	Specifies deployable items as well as the necessary deployable baselines.
Release manager	Installs settings and elements from regulated inputs to multiple test environments or into operations individually.	Specifies and implements system deployment directions.
Tester	A member of quality assurance regulators in charge of verifying one or more systems.	Generate and implements system deployment directions.
Implementer	Engages in design efforts as well as the construction, testing, and documentation of system configuration elements.	The solution's principal user. Oversees making changes to system components and ensuring the quality of such modifications. The solution is

		used for version control systems and process management.

(Source: Mueller *et al.,* 2008:58)

- **Automate process enforcement**

After the control process has been developed, it is critical to determine where workflow limitations are necessary to introduce points of control. Constraints are applied through electronic sign-off or re-authentication to apply the appropriate business and technical controls. These control points are associated with the fulfilment of quality conditions on the work items generated during the process. These control points may be developed in response to the demand for responsibility when crossing organisational borders or technical domains. Such requirements might include the acceptance of a certain software development flaw by the development team.

- **Readiness controls and improvement**

Traceability is essential for showing process control. From a traceability standpoint, demonstration of control necessitates connections from the regulation to the company policies, application requirements, project plans, business process modifications and application changes. All components should be subject to change management. To do this, the implementation governance solution is required to provide a comprehensive architecture that is automated and integrated across the IT process life cycle. The necessary business and technological controls should be applied in a non-intrusive way. An end-to-end automated and integrated solution lays the groundwork for a repetitive process that, when combined with tool-directed behaviour, offers the necessary traceability. Enforcing a procedure supplied by tools guarantees that practitioners follow the process. It also guarantees that measurement data is consistent across all projects. With these considerations, managers at all levels could beneficial decisions based on a near real-time project data provided by openness of this method.

2. RPA and change management

The involvement of the governing solution team in each RPA project assists in the proper use of and conformity to an organisation's regulations strategy. Members of the administration solution team should actively work with project teams when presenting a new or modified governance solution. A solid foundation of support for an organisational change should be formed by educating the whole company about the need for change, the vision for the end state and the objectives to be achieved by implementing the RPA project using IT governance approach. The concept should be marketed, and champions and critics recognised (Mueller *et al.,* 2008:54).

A change wave architecture is a method of organisational change focused on the gradual introduction of growing capabilities (Mueller *et al.,* 2008:54). This strategy transforms critical business processes (changing an employee behaviour) or expanding new business processes throughout a company. Figure 4.5 illustrates four phases of waves of change in a single change initiative, meaning that change done in one occurrence. It entails an establishment of a centralised solution for an organisation to

process all necessary aspects in a situation of change through a centre of excellence, definitions of a management process, securing of infrastructure and adequate controls and clearly defined ways of integrating change into the organisation. The following features are supported by a change wave architecture:

- **Changes in the waves**

Addresses capability packages that are being introduced in waves of change. Each change wave is aimed at accomplishing business outcomes, such as reducing time to market.

- **Change-of-guard initiative**

Each change wave represents a new change initiative. In addition, each project should include phases and goals to limit the risks involved with a change. Success is assessed in terms of technical outcomes, such as meeting scheduled release dates timely.

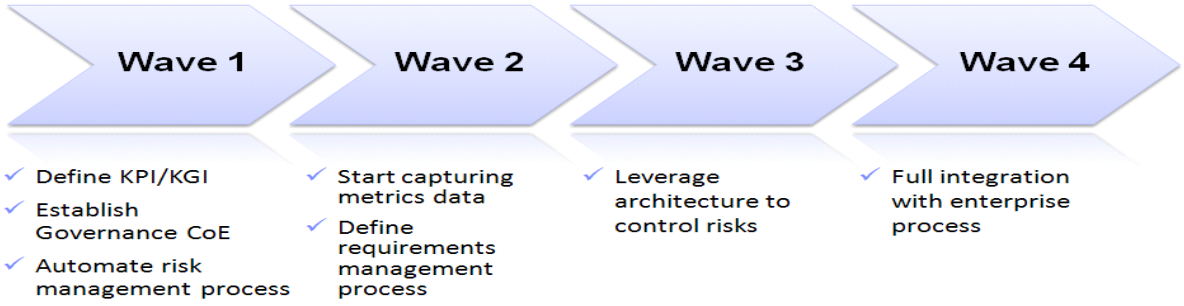


Figure 4.5: Waves of Change for a Single Change-wave Initiative (Source: Mueller *et al.*, 2008:68)

Organizations attempt to implement RPA automation to their operations without first understanding their workflows, resulting in failure of the RPA initiatives (Viehhauser & Doerr, 2021:314). Organisations continue to make mistakes when trying to automate more and more complicated processes in a single activity or process. Even though software suppliers and integrators offer organised techniques for identifying RPA process candidates and establishing internal RPA organisations, defining an automation objective as the first step in the automation journey is critical. Although this stage may seem optional, existing research suggests that it is a vital starting point, since defining a goal as foundational to process selection is crucial for identifying potential candidates (Viehhauser & Doerr, 2021:314).

Viehhauser and Doerr, (2021:315) further affirm that doing a viability analysis to identify process candidates can assist in potential processes being identified, examined and documented. A cost-benefit analysis of prospective process candidates based on business cases should be considered by organisations, prioritising economic factors and strategic needs. They further note that RPA vendors and integrators lack objective criteria and assessment models for selecting process candidates, even though high-level procedures are established relying on a general rule that complexity is used to estimate the appropriate method. The operative assessment by organisations' process owners, on the other hand, is based on subjective judgements by management and process owners rather than

quantifiable criteria (Viehhauser & Doerr, 2021:315). Below are the factors considered responsible for process automation failures as viewed by Viehhauser and Doerr, (2021:325):

- **Selecting inappropriate workflow for automation:** When organisations select processes based on their complexity and volume of transactions going through them without the criteria used neither specified or quantified, this results in a higher chance of bad process selection judgments and project failure. Because the automation of inappropriate processes is directly connected to a lack of standardised selection procedures, a rigorous process selection should be adopted from the initial RPA acquiring stage, to save time and resources because of the selection errors.
- **Complicated RPA process with many variables:** To overcome many qualifying processes in organisations, a high-level candidacy of potentially relevant processes is required to prevent process selection complications and confusion. Workshops, recommendations from operational staff, or creative approaches like process mining can all be used to make the selection. To get credible data points as foundation for the process prioritising model, process candidacy should be followed by data collection. User interaction data, system protocols, process walk-throughs and standardised templates can all be used to collect data. People in charge of RPA implementation governance should complete process prioritisation to identify the most promising process candidates that do not complicate the RPA set up with complexity variables likely to halt automation.
- **Creating irrational RPA goals:** To derive full value of automation of processes, organisations analyse processes from an economic aspect and business cases are based on standardised measures such as return on investment. Economic analysis should be isolated from process identification to prevent selecting automated processes based on an organisation's economic variables needs rather than adequate processes, since this might lead to false expectations and failure of automated unsuitable processes.
- **Undefined RPA implementation strategy:** On a tactical level, strategic decisions on the selected automation technology should be made in line with corporate goals and defined operational objectives. Clearly specified objectives could influence the whole selection process and serve as a suitable benchmark for evaluating project performance. Personnel savings, quality improvements, enhancing dependability and capability, executing time-critical activities, and enhancing compliance and security are the most common goals for RPA automation. Without a properly outlined strategy, confusion regarding roles and the way forward in the automation of processes may arise.
- **Unclear instructions on the usage and custody of RPA:** When the ownership of RPA project acquisitions is vague, it leads to misalignment among the stakeholders who are needed to make the project a success. To avoid project failures, a dedicated team of stakeholders from different departments should be involved in implementation lifecycle of RPA, and common understanding of expectations should be developed, documented, maintained, and monitored.

The most significant component of RPA process selection criterion is a high degree of standardisation, followed by a high volume of transactions, a high maturity of processes and applications, a low degree of manual labour and digital and high-quality data input and output. Automation in organisations might suffer from automation project failure to correctly identify eligible candidates for automation and the capabilities of the chosen application software if guidelines and purpose are not communicated at acquiring of RPA.

4.5 RPA Software Application Implementation

System Development Life Cycle (SDLC) is a systematic platform for implementing information systems that comprise progressive procedures (Aminu & Ogwueleka, 2020:202). The software life cycle begins with the conception of a software product and concludes with the product's removal from the organisation. The systems inquiry, system analysis, system design, programming and testing, implementation, operation and maintenance are all common tasks in the software life cycle (Aminu & Ogwueleka, 2020:202).

According to Rutaganda *et al*. (2017:111), process automation with RPA takes less than two-four weeks from commencement to production. Traditional methodologies for implementing a software are incapable of keeping up with the speed of RPA delivery. As a result, it is critical for enterprises intending to implement RPA to assess existing delivery processes and embrace agile delivery strategies (Rutaganda *et al*., 2017:111). When beginning on an RPA journey, organisations that use agile and lean delivery approaches have been found to outperform those that use traditional delivery methods (Rutaganda *et al*., 2017:111). Figure 4.6 depicts the closest way to automation of processes without the heavy involvement of IT.

The RPA provides a quick and scalable solution for automating processes, lowering process costs as illustrated in Figure 4.7 below. Despite this, many technology-based projects still fail (Rutaganda *et al*., 2017:112). While complementing technologies such as process mining offered as part of the UiPath package can help to uncover activities that can be automated with the RPA; the correct project structure and project management are critical to a successful RPA implementation. As a result, project management is critical to every automation effort. Also worth noting is that no implementation solution acts as a fit all resolution (Soybir & Schmidt, 2021:289).

Figure 4.6: Four Phases of RPA Project Implementation (Source: Soybir & Schmidt, 2021:290)

There are different software implementation methodologies. For this study, RPA implementation will be based on the combination of Scrum and Agile methodologies. The methodologies mentioned cover different aspects of software implementation. Individually, they do not provide fast, scalable and flexible RPA, but combined possess potential to deliver the best in RPA implementation. Below is the

description of each by Tokody, Ady, Hudasi, Varga and Hell (2020:471) and how they can collaboratively deliver the best deployment:

- **Agile Methodology:** This is a software implementation methodology that regards individual and personal communications as more important than processes and tools. Agile methodology prioritises working software and customer collaboration over comprehensive documentation and contract negotiation, responding to change more effectively without a rigid plan follow-up. Incorporating an agile approach into larger projects makes them more adaptable and sensitive to change, making the agile mentality effective in development. As larger projects are less flexible and might take longer to complete slowing down implementation progress, the agile methodology approach solves this by offering scalability and flexibility.
- **Scrum Methodology:** Scrum on the other hand is a software development methodical framework. Organisations can simply build and support a product in a complex and dynamic environment with this strategy. Scrum is the solution to the fast growth of technology as well as the rapid change in client demands. The method's starting point is experience, Scrum teams have fewer individuals in the project, and they govern themselves on a step-by-step basis. A new product or component that can be recognised as an element or an upgraded version of a previous outcome product, is developed at specified phases. The technique enables fast, ongoing and realistic growth.

The techniques working together construct a technology system incrementally by shortening the SDLC and reducing any activities and time related to the requirement formulation and documentation (Aminu & Ogwueleka, 2020:204). Agile techniques often employ a spiral model that symbolises a sequence of cycles or revisions and is based on user feedback. Because of the repeated iterations, a series of prototypes evolve into the final system. Individuals, activities, timelines, and expenses are all handled efficiently using project management tools and procedures, irrespective of the development plan (Aminu & Ogwueleka, 2020:204).

A combination of Scrum and Agile methodologies can readily track changes between project release cycles and adapt to new requirements while reducing time costs. This qualifies them as an excellent fit for RPA.As recognised in the preceding sections; fundamental to the RPA include flexible unconventional deployment methods, and these combined approaches are capable of tracking changes quickly, which makes them ideal for RPA implementation and continuous measure. Reviewing delivery processes and adopting agile delivery strategies are critical for firms wishing to implement RPA (Rutaganda *et al.,* 2017:111).

Concerning the RPA, organisations that use agile and lean delivery processes more likely succeed than those who use traditional delivery models such as waterfall methodology (Rutaganda *et al.,* 2017:111). The waterfall methodology software development process is separated into different phases, with the output of one phase serving as the input for the next. The output of each step is referred to as a deliverable or final product, and it flows into the following phase. Before beginning work on any of the tasks in the waterfall model, all phases should be planned and scheduled (plan-driven process) (Aminu

& Ogwueleka, 2020:205). A plan-driven process is one in which all actions are first planned and then productivity is monitored against the blueprint. While planning is gradual in the agile approach, it is easy to adapt the process to accommodating required changes (Aminu & Ogwueleka, 2020:205).

The fundamental disadvantage of the waterfall approach is that the design should be fully described before programming can begin, and the time between the completion of the system suggested in the analysis phase and its delivery is considerable. As a result, it is unsuitable for complicated projects since it is unable to accept changing requirements; altering a scope over the life cycle might lead to the project's termination (Aminu & Ogwueleka, 2020:205). Agile and scrum combined when compared to previous models, promote user participation; users have a better knowledge of the system that is being created since a working model of the system is provided. It saves time and money since problems may be detected much sooner. By identifying missing and unclear functionalities, a faster user input for improved solutions is accomplished (Aminu & Ogwueleka, 2020:210).

When implementing the UiPath for automation of customer contact centres, it is imperative to follow the methodologies of RPA project implementation mentioned above. Such recommendations offer qualities needed for UiPath to function as expected. Figure 4.7 below depicts the comparison of general RPA implementation with how UiPath application follows the general RPA methodology. Figure 4.7 below describes the UiPath implementation in depth and how the outcomes and deliverables match the RPA project implementation identified by Soybir and Schmidt (2021:290) in Figure 4.6.

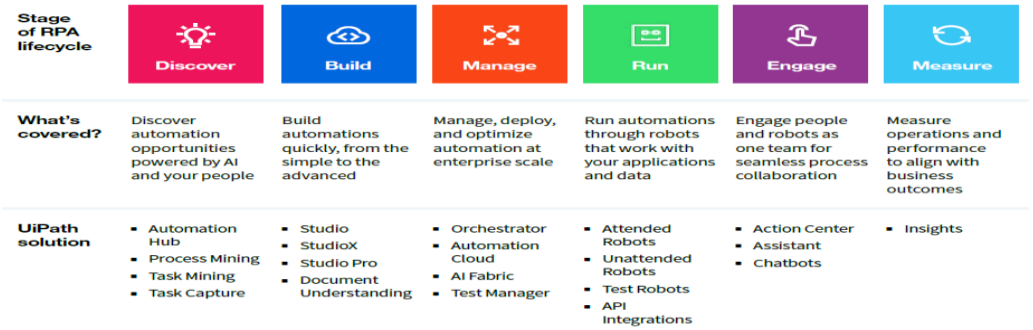
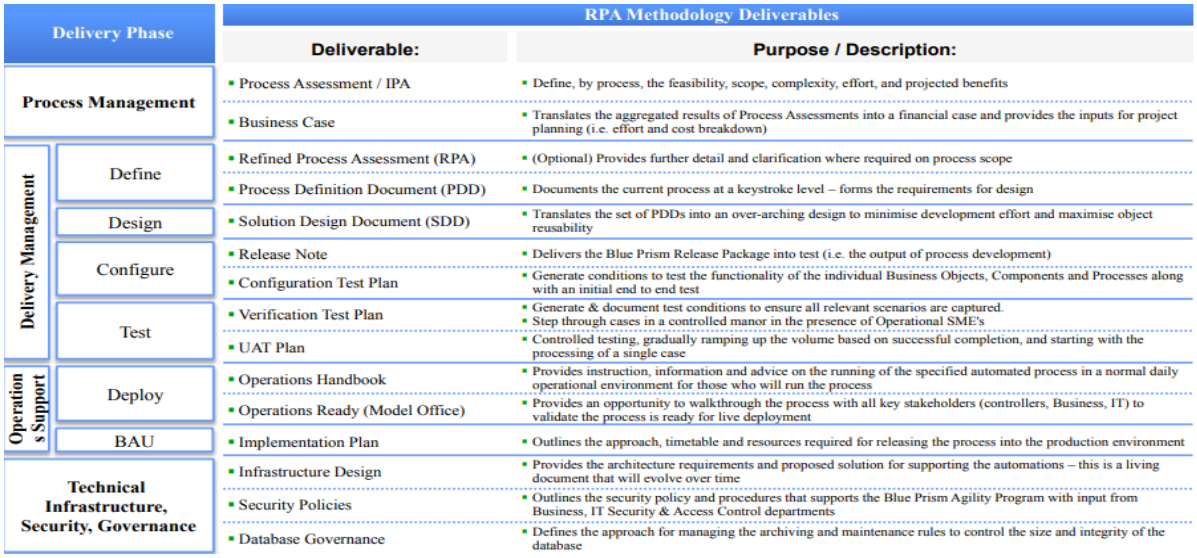


Figure 4.7: UiPath RPA Stages (Source: UiPath, 2021e)

4.5.1 RPA implementation Process

RPA implementation methodology can be created internally and modified from a combination of how IT projects and reengineering are carried out (Willcocks *et al.,* 2015:32). Some RPA providers, on the other hand, provide a standardised approach that may be customised internally, with the templates and policies being integrated into an organisation's current change management procedures (Willcocks *et al.,* 2015:32). Figure 4.8 illustrates a sample of a standardised delivery process. To guarantee the best use of the stated methodology, organisations should establish the delivery management and tracking strategy. The delivery approach described below combines process management with the definition, design, configuration, testing and deployment of a virtual robotic workforce, as well as service delivery, operational management for technical infrastructure, IT security and IT governance (Willcocks *et al.,* 2015:32).



Delivery Phase	RPA Methodology Deliverables	
	Deliverable:	**Purpose / Description:**
Process Management	▪ Process Assessment / IPA	▪ Define, by process, the feasibility, scope, complexity, effort, and projected benefits
	▪ Business Case	▪ Translates the aggregated results of Process Assessments into a financial case and provides the inputs for project planning (i.e. effort and cost breakdown)
Delivery Management – Define	▪ Refined Process Assessment (RPA)	▪ (Optional) Provides further detail and clarification where required on process scope
Delivery Management – Design	▪ Process Definition Document (PDD)	▪ Documents the current process at a keystroke level – forms the requirements for design
	▪ Solution Design Document (SDD)	▪ Translates the set of PDDs into an over-arching design to minimise development effort and maximise object reusability
Delivery Management – Configure	▪ Release Note	▪ Delivers the Blue Prism Release Package into test (i.e. the output of process development)
	▪ Configuration Test Plan	▪ Generate conditions to test the functionality of the individual Business Objects, Components and Processes along with an initial end to end test
Delivery Management – Test	▪ Verification Test Plan	▪ Generate & document test conditions to ensure all relevant scenarios are captured. ▪ Step through cases in a controlled manor in the presence of Operational SME's
	▪ UAT Plan	▪ Controlled testing, gradually ramping up the volume based on successful completion, and starting with the processing of a single case
Operations Support – Deploy	▪ Operations Handbook	▪ Provides instruction, information and advice on the running of the specified automated process in a normal daily operational environment for those who will run the process
	▪ Operations Ready (Model Office)	▪ Provides an opportunity to walkthrough the process with all key stakeholders (controllers, Business, IT) to validate the process is ready for live deployment
Operations Support – BAU	▪ Implementation Plan	▪ Outlines the approach, timetable and resources required for releasing the process into the production environment
Technical Infrastructure, Security, Governance	▪ Infrastructure Design	▪ Provides the architecture requirements and proposed solution for supporting the automations – this is a living document that will evolve over time
	▪ Security Policies	▪ Outlines the security policy and procedures that supports the Blue Prism Agility Program with input from Business, IT Security & Access Control departments
	▪ Database Governance	▪ Defines the approach for managing the archiving and maintenance rules to control the size and integrity of the database

Figure 4.8: Standardised RPA Delivery Methodology (Source: Willcocks *et al.*, 2015:32)

For Soybir and Schmidt (2021:290), an RPA project should be built up in stages. Such stages are process identification, process analysis, RPA implementation, solution go-live, and post implementation analysis. These stages align with those of standardised RPA methodology explained above. Table 4.4 below enlightens how UiPath implementation is aligned with the standardised methodology for RPA implementation, while also following and incorporating the four stages for agile RPA automation delivery lifecycle.

Table 4.4: UiPath Implementation Methodology

Phase	Outcome	Deliverables
Preparation/process identification	-The operation elements required to deliver the interaction are in place and understood by all relevant parties. - The production team has been recruited, and the project delivery strategy has been developed.	- Project requirements - Team Charter - Risk Matrix - Architecture of infrastructure - Progress report
Investigation/process analysis	-Mandated procedures are documented in full, identifying anomalies and how they are managed. - IT Security - Related needs are determined.	- Documentation outlining the Process

Automation Strategy/RPA implementation and progress	- The general strategy has been established. -A testing phase has been developed, with the training dataset selected. - Automations are built, and a deployment strategy is devised.	- Architectural design documentation -test scenarios and dataset -Updated process documentation - Revised project plan -Documentation on solution architecture. -Dataset and testing requirements. -Progress conditions documentation established. -Change to execution documentation established.
Testing/ go-live	-Designed automations are verified and implemented on an active usable setting	-User Acceptance Testing (UAT) review provided.
Hyper-Care/ post implementation	-The solution is given over to the operations team. -Various colleagues observe the process execution and a business representative validates it. Lessons gained are recorded.	The documented information has been revised because of the lessons gained.

(Source: UiPath, 2021e)

4.5.2 Challenges of RPA Implementation Process

RPA threatens the core IT function's conventional role (Osmundsen *et al.,* 2019:6919). According to Soybir and Schmidt (2021:298), implementing RPA technology comes with its own set of issues, example being expectations of management, process identification and change management:

- **Expectation management:** The ability to manage expectations is critical to the success of RPA programs. RPA is frequently presented with demands it cannot accomplish. Before beginning an RPA project, it is critical to have reasonable expectations. Organisations should have full understanding of the technology's capabilities and limitations to make informed decisions about how and why it will be employed.
- **Process identification:** The processes to be automated can be established after understanding the technology's abilities. Frequently, a solid candidate for automation is picked, but the bot set-up requirements only partially mirror the real process. As a result, when the bots are deployed to production, the process fails because the bots are unable to carry out the procedure appropriately. The cause of these flaws is frequently identified in out-of-date process

documentation. Process mining as a pre-RPA technique can aid in fully capturing the process objectively based on data before the automation project begins.

- **Change management:** RPA implementation efforts require effective change management. Accountability is essential for establishing employee faith in technology and removing worrisome ideas, such as the worry of job losses due to a software bot's replacement. Businesses should recognise that automating jobs significantly influence employees' day-to-day work. For the RPA to be truly effective, this transition and its related issues should be actively controlled from the outset of the project.

According to Hindel, Cabrera and Stierle (2020:1757), failure to adopt the above-mentioned considerations before implementation of RPA, the following unwarranted outcomes ensue:

- **Process selection and overestimation of ROI, variable cost savings:** Identifying operations eligible for automation is a big difficulty. When inefficient procedures are automated, the costs might outweigh the benefits. It is also unprofitable for occasional jobs.
- **Job losses, competition:** RPA faces many societal difficulties. Staff cutbacks that result in job losses are possible sources of internal conflict. Employees may see software robots as rivals since some occupations may be taken over by robots.
- **Time-consuming quality testing:** Because the robots lack understanding of business settings and new issues, errors in their configuration go unnoticed. Extensive quality testing is critical, especially when several robots are deployed, to avoid any undesirable outcomes.
- **Modify management and acceptability issues:** These develop because of employees' fear of learning about new technology or just being unwilling to change their work habits. As a result, effective change management is necessary to guarantee smooth implementation of the RPA. Employees should be notified in advance of new application releases so that appropriate modifications may be made. Customers, workers, and users are required to alter the company outcome. The idea is to improve the whole experience where all these elements come together, from technology to staff and users to consumers.
- **Expensive, time-consuming maintenance:** Due to process complexity or the requirement for adjustment to changing surroundings, robots require time-consuming and expensive maintenance.
- **Environmental stability:** The lack of human inspection and software robots' lack of consciousness lead to a slew of other flaws. Changes in user interfaces by software introduced during upgrades are also likely to cause low stability.
- **No recycling or reuse:** If implementation consists simply of clicks and keystrokes, a robot's set up cannot be repurposed or reused.
- **Technological know-how and skills required:** Unsolvable technical difficulties do not occur in an organisational setting, but it does highlight the necessity for technical understanding to build more scripts. RPA may be implemented without using programming languages. Having to rely on crude workarounds significantly impacts on the robot's resilience, which is critical in

an organisational environment. Another drawback is the requirement for know-how and expertise to construct RPA solutions. Additional coding needs technological expertise.

- **Sub-par, short-term solution**: RPA's flexible front-end approach is inferior to back-end integration build for machine-to-machine communication. In its current version, the RPA is a stop-gap solution, bridging the gap between manual and fully automated procedures.
- **Poor data quality, a variety of formats erroneous component recognition**: The RPA application software primarily deals with organised data that is not complicated, nor necessary for cognitive abilities. It adheres to predefined norms but cannot deviate from them. Other technologies, such as AI, should be included in the program to deal with unstructured data that is not rule-based.

Table 4.5 summarises all the major issues and/challenges in administering and regulating RPA that can be used to address any RPA application implementation and deployment.

Table 4.5: Crucial Problems/challenges Summary in Implementing, Managing and Governing RPA

Problem/Challenge	Description
Improper Information dispensation	Due to a lack of proper information dispensation, robots and business processes fail.
Accountability	Issues with a division of responsibilities, judgment and those who controls RPA governance.
Insufficient knowledge	Insufficient knowledge about a robot and its functions, as well as how and where it may be used.
Undefined Hierarchy	The allocation of responsibility between IT and business operations organisations is ambiguous.
Insufficient devotional engagements	It is difficult to stay on top of the agenda without dedication. There are instances when there are no sponsors at any of the levels of the hierarchy.
Skills, human capital support, and financial restrictions are all lacking.	It takes time and money to find the correct skills.
Complicated Process	Implementing a complicated process with an excessive number of sub-processes and problems
Specifications and Process Documentation Reliability	Overlooking of details for all the process's scenarios; Guidelines are not adequately written or preserved, they are omitted.
Management of Robots	After-implementation maintenance and supervision of the RPA. Sustainability concerns

Inadequate Change Management	Inadequate Change Management Insufficient project management processes throughout the company, particularly in IT services.
Problems with infrastructure	Problems with infrastructure RPA solutions operate in a virtualised windows environment, which poses challenges for establishing a stable IT structure and integrating with other workstation management technologies.
Data quality and data change (test data)	Any changes in transmission and distribution data might have an impact on bot performance. It also refers to an inadequate formulation of functions regulations.
Packaging of modules	The team's coding standards are poor, making it difficult to integrate multiple components.
There are no cautions.	It is connected to the inspection and management of robots. When the robot stops working, there is an absence of alerts.
Installation and verification	Installation and verification. Inadequate robot assessment and installation might lead to a larger difficulty after implementation.
Safety is paramount (data and privacy)	The rights granted to bots are applied wrongly.
Concerns about job loss and transfer	Concerns about job loss and transfer. Employees are wary of losing their jobs.
Employees opposition of implementation	When new technology is implemented, it involves alterations in employees' duties, which may need the acquisition of new skills and the modification of work processes. It will also necessitate a cultural shift. When new a technology is implemented, it involves alterations in employees' duties, which may need the acquisition of new skills and the modification of work processes. It would also necessitate a cultural shift.
Lack of understanding	Employees' lack of understanding about their jobs can result in the failure to meet the standards for developing robots. When a robot cease working, it is also connected to organisational learning.

(Source: Orynbayeva, 2020:41)

4.6 Limitations to UiPath Application Package Implementations

- **Language Barriers**

UiPath software has been established from previous chapters as an enabler of RPA technology, allowing the management, deployment and building of robots; easily emulating human actions, it also

allows knowledge workers to focus on revenue generating workflows (Ribeiro *et al*., 2021:53). Nonetheless, there are language barriers to the usage of UiPath by organisations. By default, the UiPath documentation portal and UiPath Software application are displayed in English, selecting a different language from the top navigation bar on the landing page of the UiPath software home page is an available option (UiPath, 2021h). The UiPath products and product guides are adapted for use in different locations and translated into several languages.

Some of the products offered by the UiPath support part or none of the languages available, others use only the default language, which is English. It is, therefore, imperative to enquire about offerings when purchasing the software from the vendor (UiPath, 2021h). Considering the unique variety of customers served by the contact centres, an adopted RPA software should have and support various language options to make communication easier, enabling UiPath as an adopted RPA application sort through diverse needs of customers through the emails without barriers (Ribeiro *et al*., 2021:53).

For developers, there are several coding and programming languages available that act as a bridge between computer language and human language (UiPath, 2021h). Some of them are of a higher degree, but they provide less control over computers; others are low-level and machine-friendly, using less memory and executing tasks faster. Java, Python, C++, C#, Visual Basic, SQL, PHP, and JavaScript are among the most popular programming languages. However, Visual Basic and C# are the programming languages used by the UiPath (UiPath, 2021).

The RPA platforms individually have unique basis and programming languages, UiPath uses .NET, hence Visual Basic.NET and C#.NET, requiring organisations to specifically employ them as their primary programming languages. Microsoft's Visual Basics.NET, or VB.NET, is an object-oriented programming language, providing polymorphism, encapsulation, abstraction, and inheritance concepts. Furthermore, it is a useful tool for developing web, Office, Windows, and other mobile applications based on the .NET framework. Its design is simple enough for everyone to grasp, with programs written in this language have greater scalability and dependability (UiPath, 2021h). It also enables the development of completely object-oriented programs, such as those written in C++, C#, and Java. It also works well with programs written in Visual C#, Visual C++, and Visual J#. Because RPA UiPath is a low-code platform, it makes it easier to write custom code or logic and design workflows using invoke Code Activity (UiPath, 2021h).

According to UiPath (2021h), the following are the advantages of the UiPath in code writing for developers:

- Supporting most GUI frameworks, including Java, Oracle applications, SAP GUI, Siebel, Flash, Silverlight, Win32, MFC, VB, .NET, HTML, PDF, QT, and Delphi;
- Having the action recorder and scenario wizards create code automatically;
- Having citrix and remote desktop app image-based automation;
- Providing both workflow-based automation for drag-and-drop aficionados and total code control for developers;

- Being available on both x86 and x64 platforms for any programming language (C#, VB.NET, C++, JavaScript, or VBScript).

- **Processes that cannot be Automated**

Majority of studies and researchers stress the significance of a task's frequency of execution for process selection in RPA (Asatiani and Penttinen 2016; Willcocks *et al*., 2015:5). Regularly performed jobs provide cost advantages, enabling businesses to gain considerable cost savings and to take advantage of the benefits of automation. None of the procedures or processes can be automated in UiPath software since some fall short of the prerequisite standards like high frequency and large quantity of data involved in a process described in Chapter Two. Therefore, it is crucial for organisations to comprehend the necessity for thorough process evaluation in accordance with the metrics discussed in Chapter Two on task mining. Task mining has been described as UiPath service that helps to uncover automation opportunities and determines if a proposed process is a viable candidate for the RPA technology, discarding all processes that cannot be achieve by automation UiPath (2021c).

RPA initiatives necessitate a critical evaluation model for process selection, a methodology to gauge the profitability and benefits of process automation, and a consistent approach that considers dynamics of the process requirements (Wanner, Hofmann, Fischer, Imgrund, Aniesch & Geyer-Klingeberg, 2019:8). Organisation should understand and implement metrics that clearly distinguishes between processes and procedural jobs with a favourable proportion of incremental cost-effectiveness, and those with an adverse ratio to understand a process organisation (Wanner *et al.,* 2019:8). These restrictions can be bypassed by evaluating process execution information gathered from event logs. Logs keep track of a wide range of process characteristics, such as execution and waiting periods, task handoffs between executing systems or users, or job transfers. The logs can be used to obtain additional data, such as execution frequencies and variations that can assist in identification of processes that cannot be automated (Wanner *et al.,* 2019:9).

Table 4.6 summarises the causes of IT-business misalignment and offers potential solutions that to the implementation impediments, shown how such can be effectively controlled from the commencement of the acquisition process, facilitating consistent implementation, and facilitating post implementation management.

Table 4.6: Summary of Causes of RPA Projects and IT-Business Misalignment and Remedies

Causes of Misalignment	Remedy for causes
Communication	To determine and maintain previously agreed-upon actions on RPA projects and any build-on communications, formal and traceable communication between IT and business. This serves as a guideline for any modification that should be made, that affects both IT and business capabilities.

Accountability	To avoid stepping outside the boundaries of responsibilities, IT and business management should determine RPA software custody clearly from the inception of the project.
Compromise	IT and business strategies should be considered when onboarding RPA projects and software. If there are disagreements and challenges like resources in relation to how onboarding will affect them, there should be a mutual agreement on ways of tackling any complications at the implementation stage.
Implementation methodology/strategy	Methodology to be used on the implementation should be undisputed between IT and business. It should be accommodative of different strategies useful to the business and not legacy strategies that can render RPA project obsolete.
Lack of controls	Controls on access of the acquired RPA should be well defined to prevent conflict between business and IT regarding authorisation and lack of different elements and activities of the software.
Change Management and Trainings	Training should be facilitated to both IT and business regarding the software acquisition beforehand to enable everyone working with the software to become familiar with it and comprehend how it will affect their daily duties, assisting in adapting and embracing the change brought by RPA software.
Barriers/Limitations of software	To synchronise expectations of both IT and business, it is essential to acknowledge the acquired RPA software's shortcomings in the early phases of acquisition. By doing this, problems with implicit expectations and required deliveries are avoided.

(Source: Own Observation)

4.7 Conclusion

This chapter has established that misalignment between IT and business can render the acquired RPA technology obsolete if not well managed. Therefore, all stakeholders should be consulted about and sensitised to embracing changes of technology acquiring and implementation. Implementation of the acquired software should be handled according to defined protocols to identify any inconsistencies in the application software lifecycle. Controls regarding the RPA application software could minimise risks of unauthorised access and barriers to the use of application software needs to be identified and addressed from acquiring and analysis stage.

5 CHAPTER FIVE
FRAMEWORK DEVELOPMENT

5.1 Introduction

In this chapter, a framework is designed that assists with transition of acquired RPA application software from acquiring to decommissioning in organisations. The chapter also explores how proper adoption of RPA can be beneficial to the call centre email management process, as well as ensure IT efficiency and great customer experience while delivering value to an organisation. The limitations of implementations are considered from data availability to the fitness of process or tasks to be automated. Various standards and IT governance rules will be used to generate a flow of activities that contribute towards an effective approach to software specification guidelines, to assure RPA application lifetime through process mining by UiPath application software. Finally, the developed framework for the process is evaluated to determine whether the objectives of the study have been achieved.

5.2 RPA Governance through Standards and Frameworks

Information Technology is valuable in businesses as discussed in the preceding chapters. IT has evolved from being a support to an organisation's operations to becoming the leader in value delivery, tapping into new specialised openings in the technology industry by aligning with business operations. Gómez *et al.,* (2017:135) provided that organisational leaders have recognised the importance of information technology in the success or failure of corporate operations as previously discussed in Chapter Two. Chapter Four further establishes that organisational leaders should understand the necessity of controlling their respective information systems to achieve their goals; consequently, change management and specified control procedures are required for IT to recognise new business prospects.

IT has been established as a key asset in organisations, with executives expecting IT to generate a business value by providing adaptive, secure and high-quality services. Because assets are direct income producers for organisations, improved return on investments in acquired applications is a requirement to develop the organisation and its operations. The IT department is not exempted from this requirement. The necessity to control IT and acquired applications, as well as the evolution of the IT strategy, has already been addressed in chapters three and four with Anagnoste, (2017:685) highlighting that RPA is not subject to any regulations, or a framework of governance. Because of this requirement, organisations should adopt and implement suitable security controls and methods for compliance with a productive and value-added operation, providing a link between different functions and accountability based on the diverse structures of organisations.

To ensure that every employee understands the value of compliance, information supplied about the governance framework should be delivered effectively and through channels of communication that are clearly established. All of this is feasible with a flexible IT governance architecture that supports each phase of the outlined process, hence this study's development of an RPA governance framework. This framework will allow flexibility and comprehension in an organisation's IT governance, which depends

on the ability to provide adequate supervision and control on RPA technology automation for data management, storage of processed data, and retrieval of data from silos for use in decision making.

According to ISO/IEC 38500:2015, the maturity determinants of any acquired organisational investment in the use of information technology are the deliverables produced that benefit the whole organisation and delivers value as anticipated. Investment's paybacks in IT are derived directly from the changes to the processes enabled by the usage of the acquired technology and the general business operations of the actual IT acquired or supported as discussed in previous chapters. The advantages include subsequent improvements in organisational activities and processes made possible by technology to satisfy organisational demands or requirements.

Organisations require IT strategies and support arrangements that maximise the value of investments while mitigating the risks associated with their utilisation. Chapter Four established one of the problems for organisational IT investment as ensuring that such investments and acquisitions are based on company strategies, priorities and demands. Those responsible for organisational governance should have adequate supervision and engagement in choices linked to the use of IT in the business, to ensure that such decisions are based on business strategy, risk appetite, priorities and needs. The effort necessary to reap the anticipated advantages should be recognised and comprehended (ISO/IEC 38500:2015).

Failure of an organisation to adopt IT governance might result in the usage of ineffective and wasteful technology (Rama, Suharjito & Gunawan, 2020). IT governance improves IT performance, which, in turn, improves the overall organisation's performance. The important framework of IT governance connects the success of IT to the performance of the organisation through business value creation; it further prioritises value creation and minimises risks while benefitting from optimal resource costs. IT managers now have a broader various framework from which to choose the best management practices, then develop an IT governance framework to guide the implementation of acquired technology once the stated procedure has been developed.

Hamidovic (2010:2) views the major goal of IT governance as to enact structures, procedures and support mechanisms used to regulate IT assets, resulting in greater business and IT alignment, and eventually, a higher return on IT-enabled expenditures. IT governance frameworks give management the structures needed to facilitate IT services for theoretical and business processes.

There are several IT governance frameworks and standards available to support enterprises. Some of these frameworks are labelled as IT governance frameworks while others are management frameworks (Henriques, Pereira, Almeida & Mira da Silva, 2020:49). But for this study, the emphasis is on the following frameworks and standards. These were chosen based on their contributions to appropriate IT governance on software acquisitions and their inclusion of various organisational elements to deliver a complete product that seamlessly offers the strategies of various organisations:

- Control Objectives for Information Technology 19 (COBIT 19);
- Information Technology Infrastructure Library (ITIL);

- ISO/IEC 27001:2005;
- ISO/IEC 38500:2015;
- ISO/IEC/IEEE 12207:2017;
- Capability Maturity Model Integrated (CMMI).

5.2.1 Control Objectives for Information Technology 19 (COBIT 19)

COBIT 19 is an ISACA IT governance framework; it is a tool set that enables managers to bridge the gap between control needs, technological challenges and business risks. COBIT 19 supports the establishment of defined policies and best practices for IT control across businesses (Anoruo, 2019) COBIT 19 seeks to stress regulatory compliance, assist enterprises in increasing the value gained from IT, allows alignment and simplifies COBIT framework implementation (Hamidovic, 2010:3). COBIT 19 is defined by ISACA as a governance framework that tackles the control and management of information and related technologies from an enterprise-wide, end-to-end viewpoint, covering both the IT function and non-IT business operations (ISACA, 2021). COBIT 19 coverage of all essential business factors, such as processes, organisational structures, principles and policies, environment, capabilities, knowledge, and service offerings, adds to the end-to-end element as shown in Figure 5.2 below.

For Anoruo (2019), the COBIT 19 methodology assists organisations in developing strategies and achieving governance objectives. These objectives provide a value through effective governance practices of an organisation’s operations, together with information technology function. COBIT 19's governance and management objectives are divided into five domains, namely:

- Evaluate, Direct and Monitor (EDM)
- Align, Plan and Organise (APO)
- Build, Acquire and Implement (BAI)
- Deliver, Service and Support (DSS)
- Monitor, Evaluate and Assess (MEA)

Direct, plan, build, deliver and monitor are the domains that correspond to information technology's standard functional areas. The COBIT 19 framework uses a consistent language and a reference process model for anyone in an organisation to observe and govern IT operations. One of the most critical and first stages towards strong governance is integrating an operational model and a consistent strategy for all elements of the organisation involved in IT (Anoruo, 2019).

- **EDM:** Categorises governance goals and objectives, examines strategic alternatives, provides guidance for senior management on the chosen strategic options, and supervises strategy success. RPA organisation wide strategy is conceived at this stage and how it will affect the individuals in an organisation and their daily duties and activities. EDM includes goal cascades as well as the identification of stakeholder drives and wants as depicted by Figure 5.1 below.

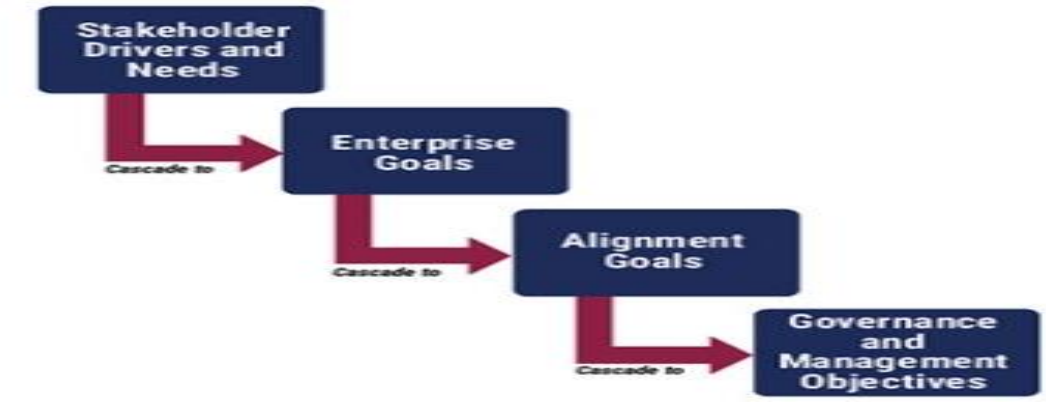


Figure 5.1: COBIT 2019 Goals Cascade (Source: ISACA, 2021)

- **APO:** Addresses the entire organisation, strategy, enabling operations for business and Information Technology. Alignment of IT and business operations for better understanding and implementation is established at this phase of the framework.
- **BAI:** Details the definition, procurement and deployment of information technology products, as well as their incorporation into operational workflows. Acquisition of UiPath application for RPA is done at this phase together with its implementation. Memorandum of understanding with vendors is established and documented.
- **DSS:** Is concerned with the operational supply and management of information technology operations, including protection and privacy, stability, and integrity. IT operations and management infrastructure and services needed for UiPath for automation of emails to CCC agents resulting in service delivery is achieved through this phase.
- **MEA:** Addresses performance management and information technology compliance to organisational set objectives, internal management requirements, and external regulations. Performance of UiPath software is established at this phase. The software is monitored for compliance and conformity to set regulations and risks measured.

For facilitation of an acquired application, a system design workflow for governance below in Figure 5.1 is employed. When designing an information and technology governance framework, the tool kit is used for modification and customisation of the predefined values to fit the organisation's context namely:

- Creation of value for stakeholders
- Comprehensive approach
- Dynamic system
- Distinction between governance and management
- Adaptation to business needs
- End-to-end arrangement.

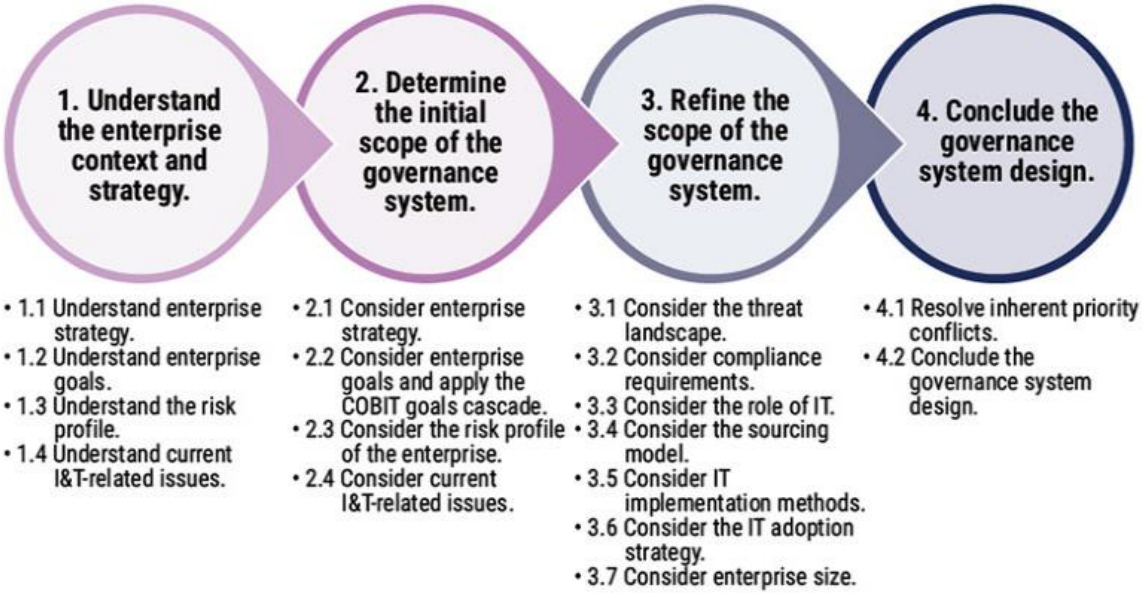


Figure 5.2: Governance System Design Workflow, COBIT 2019 Framework: Introduction and methodology (Source: ISACA, 2021)

ISACA (2021) identifies that COBIT 19 best matches organisations that use several frameworks such as ITIL, ISO/IEC 27001 and CMMI with specific silos inside IT adopting their own framework or standard. COBIT 19 is equally suitable for organisations mandated by the government and local authorities to follow strict regulatory rules. It aligns current frameworks and understands with how each framework fits into the broader spectrum of requirements. COBIT 19 assists firms in monitoring the performance of other frameworks, particularly in terms of security compliance, information security and risk management. Considering the alignment and adoption issues discussed in chapters three and four, COBIT 19 possess elements that tap into different stakeholders' roles and accountability, aiding in the formulation of RPA implementation framework to be developed.

5.2.2 Information Technology Infrastructure Library (ITIL)

The IT Infrastructure Library (ITIL) is a globally recognised and continually developing set of IT best practices meant to assist companies in overcoming current and future technological issues (Wang *et al.,* 2021:56). ITIL is primarily concerned with implementation; it outlines how service management is implemented inside an organisation and controls are addressed as part of its actions. IT departments' world-wide use ITIL as a roadmap to assist with efficient and successful deployment of current technology, along with the development of an IT service management strategy, because its concentration is on IT service management (Wang *et al.,* 2021:56). Wang *et al.* (2021:56) further outline the important elements provided by ITIL in addressing issues from corporate strategy to application utilisation as follows:

- **Service Strategy phase:** The strategic relevance of RPA automation services, their relevance to the organisation, associated risks, expenditures, and advantages are recognised.

- **Service Design phase:** During talks with service providers (UiPath in this research), ITIL processes are important to ensure that the IT infrastructure is safe, available on demand, and has the capabilities to meet the organisational service requirements.
- **Service Transition phase:** ITIL procedures support in the effective transition from manual to automated email processes, as well as establishing guidance for RPA deployment.
- **Continuous Service Improvement phase:** Service monitoring for compliance with Service Level Agreements (SLAs) and continual upgrading of service functionalities are discussed in this phase. As more suitable automation upgrades become offered, this may entail upgrading applications.

5.2.3 ISO/IEC 38500:2015

ISO/IEC 38500:2015 is the standard for IT governance. It provides governing bodies with concepts, terminology, and a model to use for analysing, guiding and monitoring the use of information technology in their organisations. It also relates to the management of the organisation's current and future use of IT, including management processes and decisions related to the organisation's current and future use of IT.

The standard is applicable to all organisations regardless of position public, private, government and non-profit, size, or extent of IT use (ISO/IEC 38000:2015). In Section 3.2.1 ISO/IEC 38500:2015 principles of good governance that inform the development of IT governance framework, as well as their importance were discussed.

5.2.4 ISO/IEC 27001:2005

The standard ISO/IEC 27001:2005 specifies the standards for an information security management. It assists in identifying, managing, and mitigating the wide spectrum of threats to which data is routinely exposed. The standard is intended for the selection of effective and proportional security policies that safeguard systems and data, offering interested parties, particularly an organisation's customers, trust (Hamidovic, 2010:2). Managing risk associated with software automating processes has been found from previous chapters to be essential, thus incorporating ISO/IEC 27001:2005 into the development of integrated RPA governance framework will be beneficial to the IT strategic objective of risk management. The guiding principles of the standard are as follows:

- **Identify:** Identification of risks related to the RPA software to be acquired are addressed and how those risks can affect the organisations' operations.
- **Manage:** Management of risks identified regarding RPA are addressed alongside risks appetite that an organisation is willing to accept.
- **Mitigate:** Ways of mitigating risks that arise during the operational phase of RPA software are defined in relation to how each organisation can address them diversely.
- **Continuous monitoring:** The acquired RPA software is continuously monitored for new, identified, and mitigated risks are to ensure their identified appetite.

5.2.5 ISO/IEC/IEEE 12207:2017

ISO/IEC/IEEE 12207 is a software life-cycle process that is an international standard described as "a framework for software life cycle procedures with well-defined terminology that the software industry can reference" (ISO/IEC/IEEE 12207:2017). It includes procedures, actions, and tasks that should be followed throughout the procurement of a software system, product, or service, as well as during the supply, development, operation, maintenance, and disposal of software products. This is achieved through involving stakeholders, with the purpose of ensuring consumer contentment. Elements of design document are provided to offer context for software goods and services. The standard also includes techniques for establishing, managing and improving the software life cycle processes inside an organisation or a project (ISO/IEC/IEEE 12207:2017).

The primary goal of ISO/IEC/IEEE 12207:2017 is to offer a standardised set of processes to promote communication among acquiring firms, suppliers, and other parties during the software system's life cycle. It is intended for purchasers of software systems, products, and services, as well as vendors, programmers, integrators, administrators, technicians, managers, quality assurance managers, and end users of software systems and products. It can be employed by a unified system in a self-imposed manner or by many organisations in a multi-party situation. Parties may be from the same or other companies, and the scenario may range from an informal agreement to a formal contract. The mechanisms outlined in the standard can be used to develop business environments, such as methodologies, methods, strategies, instruments and qualified people. Finally, it gives normative guidance for adopting the software life cycle methods. Illustrated below are the principles of ISO/IEC/IEEE 12207:2017:

- **Plans:** Strategies for acquiring organisations are matched with the offerings of the software vendor (UiPath). This ensures that there is alignment between offerings with RPA automation needs.
- **Policies and Procedures:** Policies and processes that make up the software lifecycle are matched with the policies of the acquiring organisation to ensure that the lifecycle of the software is not interrupted.
- **Records:** Records of expected outcomes from the acquired software are described for easy usage and implementation.
- **Documentation:** All documentation pertaining to the acquired software is prepared. The vendor (UiPath) and the acquiring organisations' important stakeholders have a written agreement.
- **Audit and Reviews:** The acquired software (UiPath software) is audited and reviewed for compliance with the acquiring organisations' compliance and regulatory requirements and governing standards.

Getting an organisation's software life cycle procedures under control is a demanding endeavour. The last thing a company wants in its management operation is to bring in a notified body for certification only to discover that the company lacks the necessary records or papers for the auditor to review. As a

result, ISO/IEC/IEEE 12207:2017 should be used as a reference model to enable process evaluation. For this study, it is the relevant standard for the acquisition of RPA UiPath application software as it aids in ensuring the legitimacy of the software acquisition and provides guidelines for process formulation steps and an overall life cycle.

5.2.6 Capability Maturity Model Integrated (CMMI)

The capability maturity model integrated is a systematic method to process improvement that provides businesses with the critical elements for effective processes. It is used to optimise processes across a project, a division, or an entire organisation categorising maturity into five levels: preliminary, controlled, specified, objectively managed and maximised (ISACA, 2021). Individuals within organisations use the maturity model scales to manage processes where IT process management flaws exist and create their own goals. The corporate objectives, the operational environment, and industry norms all impact the appropriate maturity level. The amount of managerial maturity is determined by the organisation's reliance on IT, its technological competence, and the value of its data. In this study, CMMI is the accurate model for RPA UiPath software maturity measurement as it assists in ensuring that processes chosen for IT operations are effective and can deliver value to the organisation. The five categories of CMMI are:

- **Preliminary:** The process to be automated (contact centre email management) is identified with all the necessary steps required to complete the entire process.
- **Controlled:** The process to be automated is controlled by the organisation by establishing measures that will deem the process mature.
- **Specified:** Specific aspects of the process that contribute to the measurement of its maturity are documented.
- **Objectively managed:** The process growth and predictability are managed to ensure compliance with the set standards of control.
- **Maximised:** The maturity of the process learning curve is used to its fullest capabilities to ensure that the RPA software performs process to the requirements of the organisation.

An effectively mapped and creative business and information technology integration can result in technological transformation, propelling the culture, market and business ahead (Anoruo, 2019). For this study, a combination of the mentioned frameworks, models and standards are used to formulate an integrated RPA governance framework using UiPath. The focus is on the COBIT 19 and ISO/IEC 38500:2015. The other frameworks mainly support the two with reference to different levels of the developed framework.

5.3 RPA Governance Framework Development

The objective of the RPA governance framework development is to condense governance procedures and create a blueprint for the long-term organisational plans and objectives for RPA implementation. The evolution and change associated with information technology, according to Henriques *et al.* (2020:48), necessitate governance, as established in the previous sections of this study. IT governance

has been established as an inherent aspect of corporate governance and asking the right questions a good approach to getting started with IT governance. With the framework to be developed, board members will learn how to ask the right questions about IT governance on acquired applications and actions to consider for addressing the demands.

IT governance in different organisations has been hampered by internal and external influences. Most of these obstacles relate to concerns of strategy alignment involving governing bodies and their communication with stakeholders. This necessitates efficient IT governance, which allows IT alignment and generates business value from IT acquisitions (Gómez *et al.,* 2017:144). The framework to be developed would assist in ensuring strategic alignment between IT and business, providing how acquired RPA (UiPath) application software yield an organisational value; it also concerns mitigating risks regarding implementations and managing resources together with applications and performance of both monitored and measured through established policies that are documented.

The model to be developed is guided by the following principles of proper IT governance from ISO/IEC 38500:2015 by ITGI (2018) which are:

- **Strategic alignment:** There should be an established consistency in achieving the objectives and tactics of an organisation. Activities delivered by the different governance structures within the organisation should be unified and aligned to reach unity and a combined direction towards one goal. Business and IT should jointly create a culture that establishes alignment, supported by IT's interest in and understanding of the business, and sharing of technology-related issues and opportunities.
- **Value delivery:** Value creation for an organisation can be attained by effective and efficient use of IT. Proper monitoring and maintenance of IT enables an opportunity to intensify value resulting from present IT investments and eradication of IT strategies and assets that are obsolete and not creating sufficient value for an organisation. The IT projects should deliver and provide services and resolutions to business operations though every evolution comes across on time and within budget.
- **Risk management:** Risk management emphasises the safeguarding of the value and integrity of IT. Risk emanates from the business operations related through usage, participation and adoption of IT within an organisation. IT risk comprises IT-related actions that could influence business decisions.
- **Resource management:** Appropriate resource deployment towards set objectives delivers value and desired outcomes. Relevant skills should be developed to accomplish the strategic plans and that satisfactory, appropriate and operative resources are available. Resource management guarantees an increased economic value using IT infrastructure provided, new technologies and appropriate personnel. Resource management distinguishes the importance of people, in addition to hardware and software, and, therefore, focuses on training, promoting retention and ensuring competence of key IT personnel.

- **Performance measurement:** Monitoring and pursuing the attainment of objectives of the organisation's IT-related services and resolutions and compliance with relevant stakeholders is imperative. The absence of monitoring performance indicators can result in failure to achieve goals and impractical applications.

5.4 Integrated Governance Model for RPA Utilising UiPath Application Software

An Information Technology governance framework is a straightforward methodology for helping organisations implement an IT governance standard. There has been only one standard for IT governance since 2008, the ISO/IEC 38500 which was modified in 2015 (Juiz, Guerrero & Lera, 2014). The following framework development is an integrated method for provision of guidance on effective acquiring to decommissioning of RPA software applications that assist in automation of operational processes of business operations that rely on information technology. This approach provides an encompassing, adoptable and well-defined life cycle of business processes for the development, adoption and continual improvement of IT governance framework. Provision of well-defined roles, responsibilities and accountability can be expected from the robust framework.

To formulate the integrated RPA IT governance framework, the elements were identified from the literature review. The implementation mechanisms of RPA technology were amalgamated from the operational perspective based on UiPath application software implementation and governance. The design of the framework is based on COBIT 19 governance framework guidelines which include provision of value to stakeholders through delivery of services, considering all contributors to completion of an identified processes; it also ensures adherence to regulations at every stage of a process where governance is not mistaken for management of daily activities and careful tailoring of controls considering of all factors to ensure processes are completed in collaboration.

With the aid of ISO/IEC 38500:2015 which is a standard for IT governance, ISO/IEC/IEEE 12207:2017 used as a reference model to support process assessment of the software life cycle and CMMI that provides organisations with the essential elements of effective process monitoring, ISO/IEC 27001:2005 for security management, the framework is developed. The collaboration approach emphasizes process standards because RPA is a process-based technology. The IT strategic objectives which are resources management, risk management and value delivery are used as essential guiding elements in the framework. The framework provides an overview of how to control and manage RPA technology from an operational, managerial and technical level perspectives, using frameworks and standards guidance. These standards enhance a correlation between organisational strategies, operational and tactical roles in implementing acquired technology. Not all components raised in this study are covered in the framework. They, however, are mentioned as side influences.

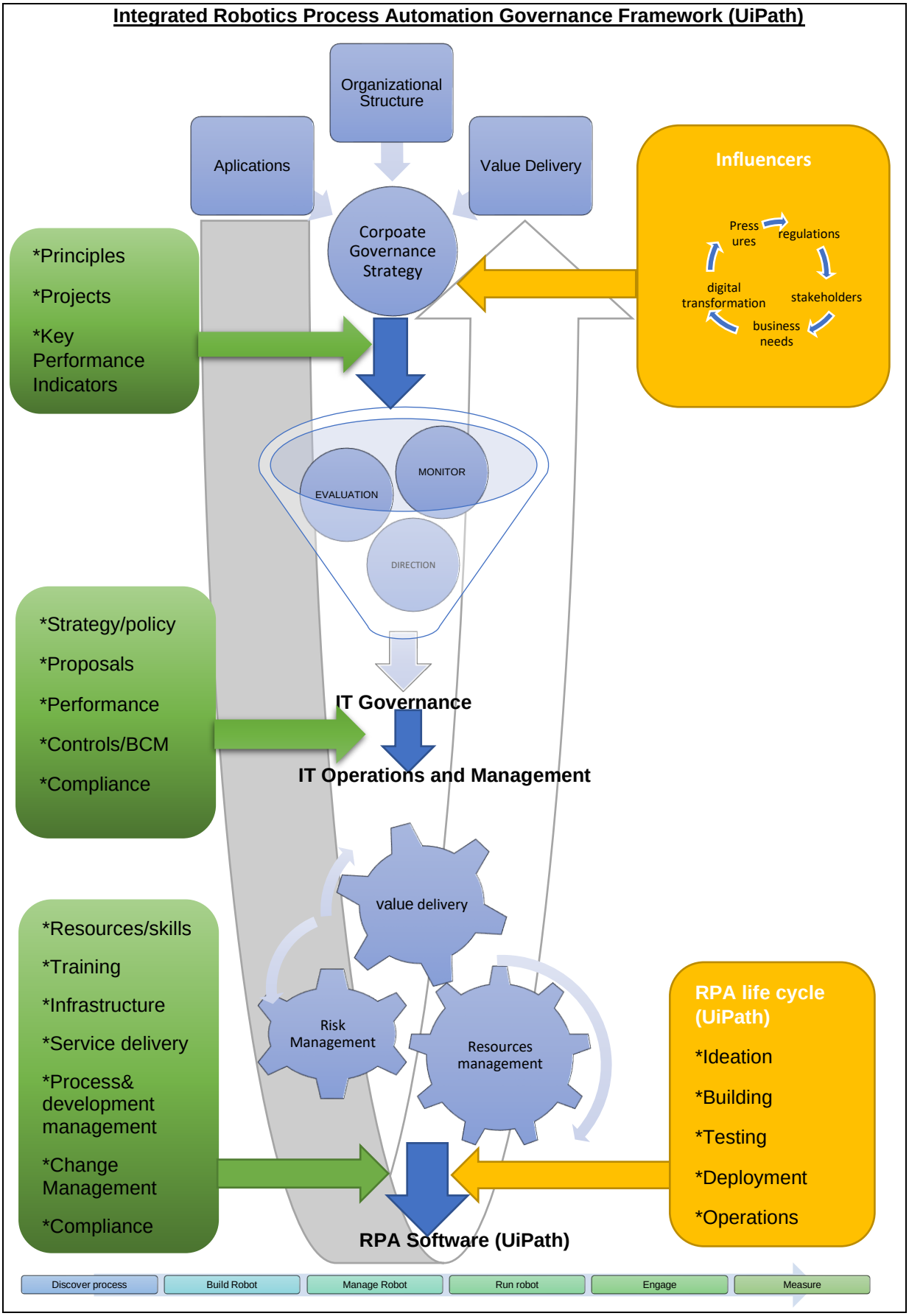


Figure 5.3: Integrated Robotics Process Automation Governance Framework (UiPath) (Source: Own observation)

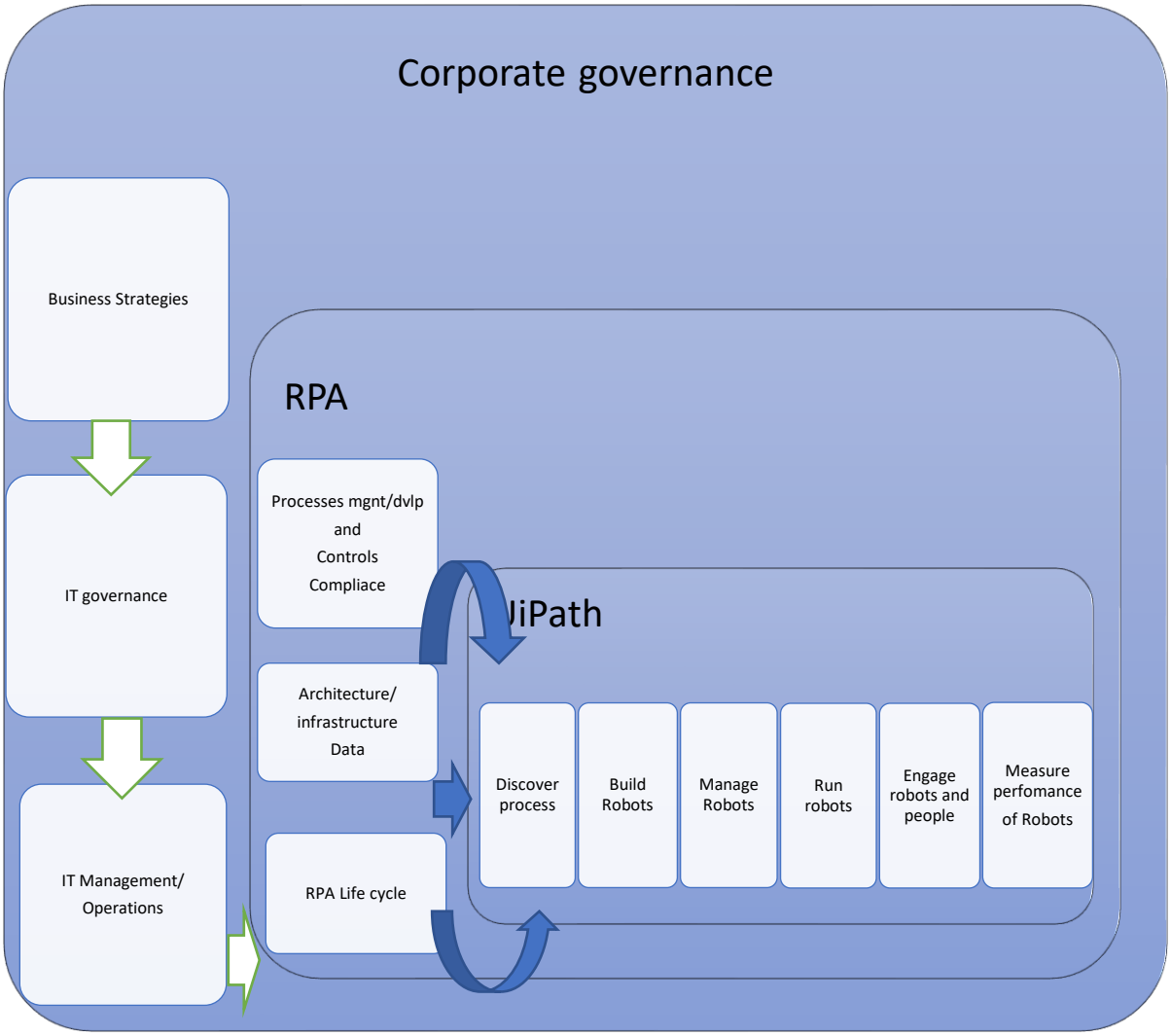


Figure 5.4: Relationship Hierarchy Between Different Levels of a Unified RPA IT Governance Framework for UiPath (Source: Own observation)

Figure 5.3 shows the **Integrated Robotics Process Automation Governance Framework (UiPath)** for RPA IT governance, based on an internationally recognised standard of IT governance ISO/IEC 38500:2015. The framework addresses the potential challenges in the implementation of an RPA application software sourced from a vender, not the IT software developed in house that follows the predefined systems development cycle discussed in the previous chapters.

The Robotics Process Automation Governance Framework using UiPath application as the software vender is a framework made up of four phases. Two of the most important guidelines followed are COBIT 19 principles and ISO/IEC 38500:2015. The guidelines are intertwined to both drive the IT governance processes. The ISO/IEC 38500:2015 standard for IT governance states that it is crucial to involve the whole organisation in IT governance and recommends the usage of mechanisms to track IT success and operational failures. The framework commences with corporate governance as the first phase, which forms a foundation for other phases as they rely on it to achieve the overall business imperatives. The corporate governance phase is informed by the ISO/IEC 38500:2015 and COBIT 19. The following two levels, the IT governance level and IT operations and management level are, likewise,

informed by the ISO/IEC 38500:2015 standard with combination of COBIT 19 principles. The ending phase is the acquired RPA application software. This last phase is also governed by the ISO/IEC 38500:2015 and COBIT 19. However, the CMMI and ISO/IEC/IEEE 12207:2017 have influenced the phase as they focus primarily on process management.

The analysis of Gómez *et al.* (2017:144) suggest that IT products and applications should be rooted in a strategic plan. The application software imperatives on the integrated framework above emanate from the corporate governance phase from the business imperatives identified. They permeate operations and a management phase through the direction and monitoring guidance provided by the framework. Application demands are worked through the governance phase, the operations and management phase to the implementation of the UiPath back to the corporate governance component of value to ensure that all the applications that are acquired are governed and ultimately produce value which in this case is better service delivery by the customer centres. Therefore, IT products and applications become the results of corporate governance principles and plans. The RPA implementation framework developed confirm that IT products and applications should be rooted in a strategic plan.

The four phases of the framework are explained as follows:

- **Corporate governance phase:** This is the fundamental phase of the framework, demonstrating who oversees the setting of strategic goals based on recognised business imperatives as depicted by the literature reviewed. This phase ensures that IT management and business operations goals remain cohere with the general corporate strategy and recommendations. Applications (systems adopted like UiPath) from business operations through completed processes and IT personnel are identified for inclusion in selections devoted to projects and investments. This phase also considers business resilience, which includes understanding of the basic systems resilience, business impact analysis, business continuity plans, data backup, storage and restoration, as well as disaster recovery strategies. Corporate governance correspondingly receives reports on change indicators for IT services, within the organisation through the combined strategy. The corporate governance phase of the framework weighs more on tangible results that deliver worth to the organisation (implementation of UiPath). This phase emphasises that the applications acquired should deliver value to an organisation for them to complete their lifecycles and performance metrics.

- **IT governance phase p**rovides a direction for implementation, evaluation and the monitoring of the acquired UiPath application. Enterprise risk management, maturity models, IT governance, IT strategy, IT rules, procedures, standards, as well as organisational and enterprise structures and frameworks connected to IT are considered at this phase. This phase influenced by IT strategic objectives such as risk management, resources management and value delivery as well as incoming requests from business that should be achieved using IT. The also phase assures that incoming requests to IT deliver value derived from the corporate strategy, by evaluating the kind of processes that are to be automated. Here, the applicability of the process to UiPath is established, as observed in the literature, the processes should be

structured, rule-based and routine. After decisions are made on the processes to be considered, processes are ranked according to their importance, that is, all process proposals for customer contact centre are checked and prioritised according to importance. Lastly, timelines are established for the acquisition and implementation of UiPath. Policies that provide direction for operations, access controls, infrastructure availability, legacy systems integration and compliance of chosen process emanate from this phase.

- **IT management and Operations phase:** This phase develops projects that enable business processes through operations or services. In the operations phase, IT resource management, service provider selection and management, IT quality control, reporting and tracking of IT performance are central. An acquired software is transformed into an asset through the training and motivation of IT and business personnel for adoption of UiPath. The operational phase is the collection of resources (Applications and software, Infrastructure such as servers, people, skills, and competencies and business data) that build technology assets. This phase also offers infrastructure support required for the configuration of the physical and virtual servers for UiPath robots. IT Infrastructure ensures that the platform for UiPath runs on scalable and secure hardware, servers and the environment are backed up and run like other organisation's technology services.

  IT management and operations phase considers business continuity and disaster recovery, ensuring that any unforeseen obstacles are catered for to ensure operations of UiPath do not abruptly end. This phase guarantees compliance, ensuring that the projects' solutions are configured and applied in conformation with legislative requirements, that security is appropriate, and that data is held in an appropriate way. As compliance comes earlier and later in all RPA projects (it emanates from the IT governance phase), it is at this phase of the framework that the output data for UiPath robot from use is stored for regulatory compliance in a format that is recommended by the governance standards. Security control is tailored to the UiPath software robots and risk management is incorporated and considered everywhere in this phase as part of the IT strategic objectives derived from corporate strategy.

- **Application Software (UiPath) phase:** This phase of the framework forms the implementation of the chosen RPA application software UiPath. The implementation comprises six stages as per UiPath's' implementation guide described in Chapter Four:
  - **Discovery process:** Discovery of automation opportunities is done at this stage; prioritisation of process projects is completed together with an automation pipeline and a clear path to value delivery. Employees are encouraged to solve process inefficiencies by sharing ideas on one platform in this phase. Requirements for the process to be automated are established, detailed knowledge about business processes, workflows and activities are analysed and documented with a simplified guidance to create automations. Control points of the automated process are also identified. UiPath does all this through enabling elements which are process mining and task mining.

- **Built robot:** Employees become the automation creators, people with different phases of coding skills build scalable, adjustable, and smart automations using drag-and-drop canvas and template dashboards. However, when developing automations, the quality of design and coding standards are critical, suitable construction is important for added robot's deployment. Without a clear definition of the digital standard operating procedures, the automated process might break down. It is, therefore, imperative to ensure that the right quality of code is available, segregating duties, and the implementation of effective change management is not a problem considering that procedures are critical. The design of the technology solution is established at this stage. UiPath enables this step by studio and document understating.
- **Managing robot/ deployment:** Placement of RPA functionalities into the available infrastructure is completed at this stage. When deploying the automation, it is important that the correct and tested version is put into the systems. AI is built into every part of the UiPath platform to assist with automating and management of complex cognitive workflows, adding intelligence, and reaching new phases of productivity. UiPath does all this through its studio elements like orchestrator, automation cloud AI fabric and test manager.
- **Running robot/production testing:** Easy to build and manage, flexible robots make up the virtual workforce capable of working non-stop. Working together with employees both on business and IT applications, robots integrate into the environment. Control of both attended robots and unattended robots that work behind the scenes is needed. Testing the automation confirms that the process was critically analysed and correctly implemented. All robot cases should be tested to validate all potential deviations. User Acceptance Testing (UAT) is completed at this stage, with end-users providing efficiency feedback on robots.

- **Engagement:** End-to-end creation of co-operative environments where humans and robots collaborate to optimise entire processes is done at this stage. A robot aid brings exceptions and approvals to an employee, keeping the meaningful work flowing. Such aides are pre-built robots like chatbots, robots respond to customer requests in a human-like conversation. It is critical to have the right phases of operations around automations to help to ensure compliance between shared duties. Issues can arise due to application availability, changes in process, and other variables. These potential issues are mitigated into a good operational view of automations through the UiPath action centre, assistance and chatbots management.
- **Measure:** The control of an automation program and alignment performance with strategic business goals is done at this stage. Embedded analytics assist by checking in on the robots, tracking the ROI of organisation's automation program and boosting performance. It is critical to have the right phases of operations around automations to

help to ensure compliance. Issues can arise due to application availability, changes in process, and other variables, UiPath enables this through the provision of insights.

- **Maintenance:** Hyper care should be applied to each new automated process to ensure that any issues are promptly addressed and corrected. On-going support and maintenance are essential as the RPA software is upgraded, new technologies are added, or the underlying systems amended. Continuous regulation and upkeep are needed to identify and eradicate any errors swiftly.
- **Decommission of the robot:** The assessment of adopted automation software's value delivery is a continuous process; organisations can decide to get rid of any robotics processes after assessing that they no longer serve the interests of an organisation. The decommissioning stage is where appropriate measures are taken to discard all the functionalities of the software application acquired.

Figure 5.3 illustrates how the enablers of governance previously discussed in Chapter Three contribute to the overall framework as well as their importance in ensuring objectives of each phase are met. The mechanisms used to ensure seamless integration of phases are mentioned in green and gold boxes in the framework. The mechanisms consist of several interlinked processes and metrics in the strategic, tactical, and operational phases; they summarise the influences on the successful IT governance framework that cover the organisations from strategic, tactical and operational phases. The components making each phase are marked in blue colour, and the blue arrows depict the transition from one phase to another. The last phase, which is actual RPA application (UiPath) assisting in governance of acquired applications implementation, is enabled by an RPA lifecycle, which follows an automation process lifecycle.

Figure 5.4 represents the organisational hierarchy in relation to information technology governance. Every phase of the hierarchy is interrelated to the other within the framework. The corporate governance phase has the responsibility for developing strategic goals and plans for an organisation and identifying business imperatives for IT. The integrated RPA governance framework developed ensures that IT strategic objectives are aligned with corporate strategy, and that proposals from business operations and IT department are included in groups given the authority to sift through dedicated protocols on IT investments and endeavours. The corporate governance phase, being the core, requires update pointers for IT services and value delivery by an acquired software. The delineated dependency is depicted by Figure 5.4, which illustrates how the phases of the developed framework are interrelated and how they depend on each other.

5.5 Mapping of Governance Standards and Frameworks to the Integrated RPA Governance Framework Phases

One of the reasons for the failure of the governance systems deployments is that they are not established and subsequently maintained correctly as programs to guarantee achievement of benefits. Governance initiatives should be established and promoted by senior management maintaining the

scope and realistic objectives. These precautions enable the firm to absorb the projected rate of change (Anoruo, 2019).

The following goals motivate the planning process on the developed framework:

- To regulate objective adaptations, processes are used to evaluate progress and connect IT governance with wider organisational governance and direction.
- Through organisational governance of IT, the requirement can be addressed for understanding development, successful deployment and comprehensive management and monitoring of organisation's IT and acquired technologies like RPA.
- To create key performance metrics that may be used to assess and give operational responsibilities to personnel within the business divisions of an organisation.

The following Figure Depicts How COBIT 19 Maps out the Integrated RPA Governance Framework.

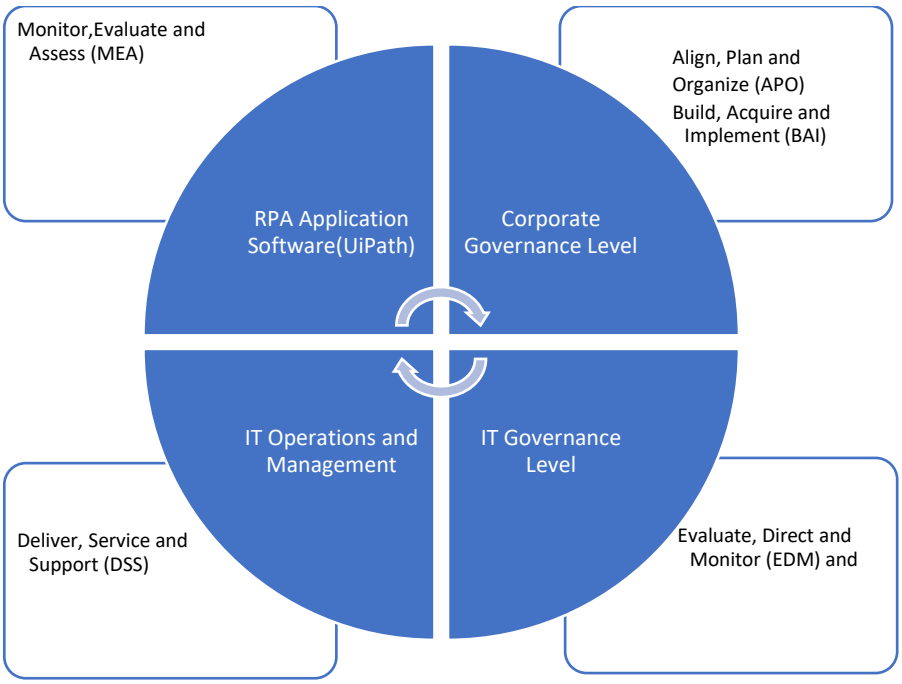


Figure 5.5: Mapping of COBIT 19 Framework Principles to the Integrated RPA Governance Framework (Source: Own observation)

COBIT 19 sharpens business and IT capabilities so that they can both comprehend the fundamental demands of the organisation and develop technological solutions to such needs. Evaluation of the framework using COBIT 19 and ISO/IEC 38500:2015 methodologies and establishing regulations enables the organisation to produce findings that maximise IT expenditure and create value for satisfying stakeholders.

COBIT 19 has contributed to the developed framework. All phases of the framework were based on the COBIT 19 management and governance principles as depicted in Figure 5.5. All phases conformed and aligned with IT strategic objectives which are IT service delivery, risk management and resources management. Together the IT objectives deliver a stakeholder value on the RPA application UiPath software used to automate customer contact centres and deliver efficiency and effectiveness to an

organisation, forming a cycle that provides continuous governance on all phases of the adopted framework. ISO/IEC 38500:2015 principles of responsibility, accountability, strategy formulation, acquisition management, performance checking, conformance and behavioural assessment of human capital were all applied to each phase in conjunction with COBIT 19.

Table 5.1 summarises frameworks and standards used as contributors to ensure framework governance from business operations, IT operations and application software. Individual principles are mapped to the phases they contribute towards the RPA governance.

Table 5.1: Standards and Process Management Frameworks Mapped Against the Integrated RPA Governance Framework Phases.

RPA Integrated governance framework	**COBIT 19**	**ISO/IEC 38500:2015**	**ITIL**	**ISO/IEC 12207:2017**	**ISO/IEC 270001**	**CMMI**
Corporate governance phase	Align, Plan, and organize	Strategy formulation, Accountability, and hierarchy formulation	Focus on value, strategy phase	Plan software acquisition	Confidentiality, Availability, Integrity of information. Identify risks	Incomplete, Initial stage of maturity of process (Preliminary investigation)
IT governance phase	Evaluate, Direct, Monitor Build, Acquire, and Implement	Acquisition, Performance	Progress iteratively, feedback and design phase	Policies and procedures of the acquired software	Confidentiality, Availability, Integrity of information. Manage risks	Managed, Defined process maturity (Controlled processes)
IT Operations and management phase	Deliver service and support	Conformance, Performance, human behavior	Collaborate, Promote visibility and transition phase	Documentation of software	Confidentiality, Availability, Integrity of information. Mitigate risks	Quantitatively managed Process maturity (Specified processes)

RPA application software (UiPath) phase	Monitor, Evaluate, and Asses	Assess Performance	Engage widely and continuous phase	Audit and reviews on performance of the chosen software	Confidentiality, Availability, Integrity of information. Continuous monitoring of risks	Optimised Process maturity (Objectively managed, maximised process)

(Source: Own Observation)

5.6 Model Development Evaluation

IT governance stakeholders derive strategies and determine business imperatives that are crucial for actioning by IT. These strategies are determined in the corporate governance phase then directed to the IT governance phase. Proposals provided by identified business imperatives are evaluated, and IT operations performance is monitored to ensure that they perform as expected. The accomplishment of a beneficial implementation of the framework solely depends on the collaboration and mutual understanding established in the structures found in the four phases, central to the framework.

The following components adapted from Orynbayeva (2019:54), are applied everywhere in the framework, they are also informed by ISO/IEC 38500:2015:

● **Change management:** Whenever there are modifications to the process, acquired RPA software and to the resources involved in the flow of the framework, such modifications should be duly documented and communicated.

● **Roles and responsibilities:** Roles, responsibilities and accountability of all relevant stakeholders should be clearly outlined regarding the acquired RPA software.

● **Standards:** Ethical dealings with all stakeholders involved in RPA software and its implementation should be maintained and documented. This gives meaning to interactions with stakeholders, offering helpful and productive regular updates.

● **Identity and access management:** Access controls of application software robots should be established early, and boundaries and privileges set.

● **Communication:** Clear and concise communications should be established for all employees regarding protocols for the RPA robots. There should be open channels for consultation and for questions that may arise regarding robots. Adoption of robots make people uneasy. Therefore, having an open-door policy on issues to be expected and how they could be addressed offers an opportunity of adoption and eradicates resistance. Representatives from both business and IT groups should be initially engaged from acquisition planning to cascade important communications.

● **Knowledge management:** There should be sufficient knowledge on the operations of acquired RPA software. Knowledge gathered from frequent interactions with robots should be made common to all the employees and relevant stakeholders. This enhances maintenance and understanding of any errors that may arise.

● **Best practices/training:** There should be adequate RPA related training offered to all the employees who will engage with robots and other personnel. Best practices and guidelines of international standards should be followed at every stage of the framework.

5.7 Conclusion

This chapter has presented the development of the RPA integrated framework. The chapter has thus outlined the frameworks and standards used to ensure it encompasses all elements of a flexible governance framework. The chapter has further outlined how the developed framework can assist organisations in deriving and creating value from their information technology while embracing corporate wide and IT strategies. Also were discussed are limitations of the proposed framework, as well as addressing any emergent threats. The overall interrelationships of all stakeholders have been identified for guaranteeing that the acquired applications software delivers value to the companies through customer satisfaction.

6 CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This concluding chapter summarises the main findings of the study. In this chapter, the preceding chapters are summarised, research questions answered, and conclusion drawn based on the literature reviewed and limitations to the study. The findings of the study are thus summarised, analysed, synthesised, ending with the conclusions and recommendations as possible adoption pathways formulated by the integrated RPA governance framework. The framework uses the UiPath model, that defines best governance practices and technology fit, to ensure that the email management process is achieved and aligned with both the business and IT strategies.

Gartner (2021) and Forrester (2021) have established that UiPath is the current leading automation, advocating a robot for everyone in an organisation and empowering robots to acquire new skills using artificial intelligence and machine learning. Robotic Process Automation (RPA) platform has computerised monotonous and time-consuming daily duties of employees for different organisations. On this basis, the increased effectiveness and efficiency in attendance to customers by contact centre agents, leading to better customer experience and satisfaction of employees in their daily routines has been noted.

Ability to use the RPA through UiPath application software, call centre email management processes should be defined by an organisation. If defined, automation of the processes will not cause any unwarranted outcomes. Besides, the RPA process selection criterion has been found to be based on processes that produce a significant volume of transactions that have clean and structured data. The processes should also have been practised, and results known for each workflow that requires a monotonous and repetitive manual effort, resulting in a high rate of errors. (Viehhauser & Doerr, 202:314).

6.2 Research Questions Answered

To achieve the study's objective, research questions were identified in the beginning chapter which supported the acquiring and the lifecycle of the final RPA governance framework using the UiPath. Questions were introduced in Chapter One and were answered during the research. Table 6.1 summarises the answers to the questions derived from the literature reviewed. Included in the table are the practical applications of the theory studied at operational level within organisations' CCC departments.

Table 6.1: Research Questions and Study Findings

Research Questions	Findings	Practical Application of Theory at CCCs Operations Level
What are the specific skills set requirements regarding RPA implementation and usage in CCCs?	The literature reviewed has explicitly shown that RPA does not require special usable programming and coding skills. The chosen application software UiPath also established that no technical skills are needed for individuals to be able to work with the software. However, training is essential for end-users (CCCs agents) to understand how UiPath operates, and what role and responsibilities a customer contact centre agent plays in ensuring smooth workflow. The technical skills required are only concerned with developers, affecting only the IT department that ensures that the functionalities of the application software align with the organisational architecture/infrastructure and resources available, while also delivering a service value to the organisation.	Training in the use of systems within various organisations is still crucial since efficiency and effectiveness of communication and customer service skills presently recognised vital in CCCs rely on them. For end-user CCCs agents, UiPath software training may be a part of the onboarding and induction package. Due to frontline automation, this will allow for a reduction in the need for new skills training. Also, it is possible to educate existing workers using a step-by-step paradigm so that they may quickly become used to using the RPA UiPath application. In contrast, developers from the IT department of an organisation can receive training from the moment the decision to acquire the technology is conceived until the implementation of the application (UiPath), allowing them to move seamlessly across every layer of the technological setup with new entrants following the same procedure as end-users on induction.

How to assess the suitability of the chosen process for automation using RPA technology through UiPath software?	This study has shown that organisations should identify processes that are repetitive, with high volumes of transactions, for RPA for an organisation to obtain the ultimate benefits from the application. To assess the suitability of the process for automation, UiPath application software offers task mining capability that assists in mirroring tasks done by the human users to complete their duties. Therefore, determining whether the process is worthy for automation.	When an organisation decides to acquire and use RPA technology, it should also make an investment in change management and process documentation. This will make it simple to identify processes within an organisation that are repetitive, which will automatically qualify the process for RPA. In CCCs, managers will need to cooperate openly with process officers and disclose all phases required to complete customer email attendance to carry out process prioritising. The UiPath component of task mining will be able to replicate the proper processes and help in ways under which robots can make the process effective if agents attending to emails are precise in the steps that are efficient for an email to be resolved.
What is the difference between managing RPA and existing IT applications and how does RPA UiPath software integration with legacy systems affect the output of the process selected?	RPA uses available IT infrastructures organisations have, there are no required systems to be developed to accommodate RPA. The controls already on the systems apply to the application software used by the RPA, in this case, UiPath software. Scalability, security, control, and governance of IT infrastructure cascade to RPA software through the easy integration of RPA and legacy systems. The governance of RPA is similar to that of internally developed software because it is subject to the same rules, policies and regulations.	No specialised infrastructure is required to be developed in the case of CCCs to use UiPath. Some features that are necessary for UiPath to function can be modified to work with the hardware and software that is available. The requirement to retrain the Agents on how to manage and use RPA IT infrastructure is eliminated by using IT infrastructure blueprints, regulations and governance standards already in place that provide guidelines on device usage to all IT projects. The

		integration of UiPath with CCCs familiar technology boosts organisational efficiency since it prevents interruptions brought on by change that might make agents less productive due to resistance to change.
How can misalignment between IT and business strategies affect RPA?	Misalignment of IT and business has been found detrimental to successful implementation of RPA projects, often rendering them obsolete. It is therefore imperative to establish, document, maintain and monitor a mutual understanding between IT and business, continuously remedying any possible inconsistencies. The study also found that a properly followed accommodative implementation strategy that allows agility solves misalignment and increases the efficiency and effectiveness of RPA acquired applications.	Organisations' leadership responsible for setting organisational imperatives and strategies should take into considerations needs of applications users when implementing goals. CCCs management should be given opportunity through proper channels to discuss their issues. This will enable CCCs agents' pain points to be addressed with RPA applications to be acquired, and those can be made to accommodate the specific needs rather than general organisational goals. Any misalignment can lead to acquisition and usage of RPA (UiPath) technology that is not beneficial to CCCs. Additionally, because RPA is agile, any developments in the applications that render the applications unusable or failing to meet the expectations should be clearly stipulated by CCCs management in time for changes to be implemented on the robots for efficiency and effectiveness of RPA.

How to manage governance implementation risks that come with RPA?	Failure to implement the correct governance framework can lead to the use of technologies which are ineffective and inefficient rendering them unusable. Therefore, the study established the importance of having controls for security risk, human resources risk, system failures and invasion problems during and post implementation. Controls are needed from when the RPA application software is acquired to when it is decommissioned with consistent checking and monitoring to ensure their stay within the predefined boundaries. It is imperative to have access control mechanisms in place for general and application access for robots and people, to ensure security and privacy are anticipated and catered for. Constant verifications are required in the workflow from acquisition to decommissioning of robots and processes that they facilitate. The reason for cautious behaviour is that data can be manipulated and wrongfully used by the rightfully configured robots and any possible failure of robots can be easily anticipated and managed.	Both front-end and IT department management ought to evaluate the risks associated with RPA technology (UiPath) usage in CCCs to specifically identify vulnerabilities that CCCs agents potentially impose on the application. Technology-related risks must be unique and in line with CCC's operations. It is important to specify the monitoring of risks that CCC agents may impose on the acquired RPA applications and how these risks might be mitigated when they do occur. Segregation of responsibilities and maker-checker verifications should be integrated into the CCC processes chosen for automation from the commencement, throughout the project, and at project decommissioning. To minimize any compromise at the commencement of RPA acquisition projects, security protocols (both physical and virtual) should constantly be maintained, monitored and documented in CCCs.

How can the involvement of IT governance in every step help to achieve operational excellence and improve customer experience?	It is essential to anticipate the failure of robots occurring, and measures to be taken when it occurs thus involving IT and its governance. RPA IT governance framework mitigates supervision in relation to software robots by establishing pre-defined processes and essential contributors to consider for warranting the reliability of the acquired RPA application software. IT governance offers guidelines in relation to handling and managing IT infrastructure. The governance of IT can be cascaded down to acquiring RPA applications, assisting with proper strategies bound by information technology standards and procedures of avoiding system failures, and ensuring operational excellence and best customer experience.	The involvement of IT governance in RPA software deployed for CCCs is important for CCC agents who offer customer services. Application software utilisation that is guided minimises downtime, which can impair CCCs' ability to offer services effectively. Standards-based, policy-based, and framework-based guidance will guarantee that the use of CCC's RPA application does not violate established internal and external rules. Objectives established by CCCs will make sure that governance alignment is considered while commissioning RPA UiPath and that any deviations are handled with while taking IT projects into consideration since RPA is a significant proportion of such.
What essential contributors would be addressed by the RPA governance framework?	Essential components that contributed to the development of the RPA governance framework are strategic alignment of business and IT, RPA software access control, IT infrastructure, risk management, value delivery, change management, security, training, segregation of duties and abiding by RPA regulations. Correspondingly, compliance, documentation, resource management and RPA UiPath implementation procedures were considered. The developed integrated RPA governance framework using UiPath emanated from the literature reviewed. The	UiPath's integrated RPA governance framework has demonstrated the significance of incorporating software end-user feedback into the designing of acquired applications that organisations acquire to maximise their value. Together, CCCs management, organisation leadership, IT engagement, and alignment can archive the automation of emails, fulfilling service delivery to their clients while also controlling risks that the acquisition can impose on both the organisation as a whole and the end-users. The

	implementation and lifecycle of the RPA application software were derived from UiPath lifecycle and IT-business alignment, with IT governance and RPA mechanisms also established from literature. The standard which informed the design of the framework is the ISO/IEC38500:2015 with COBIT 19 governance principles, focusing on controls and other IT standards together with process models.	cascade and transition of requirements from corporate governance strategy through IT management and IT service delivery to the acquired RPA application UiPath demonstrate how alignment of all stakeholders within an organisation can result in value delivery, guidance and structure for specific chosen departments, as well as the overall direction of organisation strategy.

(Source: Own observation)

6.3 Recommendations for Further Research

The designed IT governance framework solution in this study which is the **Integrated Robotics Process Automation Governance Framework (UiPath)** does not encompass every requirement for the governance of RPA processes. Therefore, it is important to consider a different RPA software when using the integrated RPA governance framework. With the relevant methodology, any organisation can derive the desired expectations in the automation of processes through the framework.

This study has established that, one of the key advantages of RPA is its simple implementation and quick scaling. As a result, to fully realise the technology's potential, RPA should not just be viewed as a one-time initiative, rather as integral to the organisation's digitisation strategy. Different techniques of incorporating RPA into an organisation should be further examined.

Organisations that aim at building and having effective and efficient IT governance competences in relation to RPA should have a defined plan and recyclable way to use the integrated framework developed in the study. Organisations could use and make additional changes to the developed RPA governance framework to provide a better model and new insights in the future. Inclusion of artificial intelligence and machine learning in the framework for governance could assist in attaining the all-round benefits of robots, that can learn incrementally. Literature indicates that RPA is becoming more intelligent, technologies continue to transform the role of IT within organisations. Thus, a recommendation to investigate how other technologies influence RPA and UiPath application software is required. To conclude, the theoretical knowledge derived from developing integrated RPA governance should be further investigated to include changes in technologies.

6.4 Limitations of the Study

The developed integrated RPA governance framework has inefficiencies as some contributors of the overall IT governance are not included. The hierarchy cascade and individual roles and accountabilities

involvement in governance for example, are overlooked. The study has not explicitly shown ways in which different processes can be automated; it is only limited to contact centre email management at a contact centre with general guidelines on how contact centres could be automated.

The evolution of research in the field of RPA instigates future research opportunities regarding RPA growth with intensity. Process identification differs depending on the application software chosen, and with innovative approaches and technologies such as artificial intelligence, cognitive computing, and machine learning. Such a scope institutes a new field of research that has not been considered for this study.

The integrated RPA governance framework remedies a portion of issues resulting from acquiring and managing software robots limited to risk management and, value delivery by established process methodologies and essential contributors to ensure consistency in RPA software acquisitions. However, the biggest deficiency of the integrated RPA governance framework is that the framework has not been validated with real-life cases for practicality.

6.5 Conclusion

Obsolete IT governance framework in the technological situation can result in an organisation encountering issues in relation to its strategic objectives which are risk and security management, resources management and the delivery of value, services and impractical acquired RPA application software. The goal of this study was to display how RPA IT governance using UiPath application software can deliver value to an organisation, while aligning business strategic objectives with IT objectives and imperatives.

This was facilitated through the application of principles of ISO/IEC 38500:2015, using tools provided by COBIT 19, ISO/IEC/IEEE 12207:2017 used to support software life cycle process assessment. The Capability Maturity Model Integrated (CMMI) that provides organisations with guidelines for effective process management and ISO/IEC 27001:2015 that provides guide on risk management of information used by RPA applications. IT governance issues were addressed in the RPA implementation, showing how guiding principles of ISO/IEC 38500:2015 can be used to inform an IT governance framework. Components of the mentioned IT governance frameworks and standards were combined to demonstrate how integrated RPA IT governance framework can be formulated, serving as a route towards the use of existing frameworks for IT governance and standards for the purpose of RPA governance.

The developed RPA governance framework using UiPath is an integrated approach to monitoring, direction and evaluation of diverse types of RPA applications that can be acquired by organisations. It provides pathways for operations, from acquiring to decommissioning of software, and how the application can derive value for an organisation by changing manual operational processes of organisations' contact centres email management operations and other duties, to automated processes freeing resources for other organisational needs. The framework provides organisations with an encompassing usable solution that can ensure consistency in the life cycle of business processes

implementation, for the development, adoption and continual improvement of RPA software applications governance.

It further provides the elements of action, roles and relationships between different contributors that complete an organisations' strategic alignment with IT and enhance RPA UiPath application software's automation of contact centre email management process. Likewise, risk, authority and accountability for IT governance has been defined by the framework.

This study has presented reviewed on RPA, using UiPath application software in the automation of contact centre email management. The integrated framework designed was informed by ISO/IEC 38500:2015 in collaboration with COBIT 19 and other software and process standards provided by ISO. Along the SLR process, quality articles, journals and published books were selected from scholarly databases and analysed. Analysis of the literature has assisted in drawing the following conclusions:

- RPA governance framework should include elements of IT service delivery, risk management and resources management that aid in acquiring, maintenance, decommissioning and management of software robots. The management of the processes orchestrated by UiPath application, (or any chosen RPA software), for implementation and management of robots, should comprise of communication, change management, segregation of duties, access, and control tools for processes. Appropriate guidelines of COBIT 19 governance framework and ISO/IEC 38500:2015 together with other standards that ensure risks associated with RPA are well managed and processes identified follows guided and established workflows should be adopted.
- The relationship between an IT department and the general business operations are differentiated by the effectiveness and efficiency of its adopted IT governance. An IT department has been established as an asset to an organisation, with its evolution from being just a service provider to being a business enabler through alignment of IT and business strategies; organisations can thrive and accomplish beyond their offerings. IT and acquired RPA software require governance in the same way as other traditional assets in the organisation to make applications governed and comply with regulations.
- Several guidelines have come out as representatives of the standards of IT governance. However, the only established international IT governance standard is the current ISO/IEC 38500:2015 and COBIT 19 ISACA framework for governance offering IT governance control guidelines.
- To present a complete and adaptable IT governance framework, it was found imperative that the essential stakeholders of the business participate in the acquiring and implementation of RPA software. The inability of an organisation's stakeholders to do so warrants consequences that renders the operations futile.
- Similar to the procedures followed to design any system through System Development Lifecycle (SDLC), RPA follows a defined project implementation methodology. Divergences between contributors to the implementation of acquired application failure at the commencement of a

project render the whole process unsuccessful. Therefore, actions related to duties achievement, that provide executive management insights into the alignment of IT and business should be defined and followed to ensure application control and management.

- Organisations are compelled to educate and involve their employees in the process of automation for smooth transition, conformity and embracement of automation. As such, there would be focus on the initiatives requiring innovative thinking for organisations and ability to deal with the critical organisational manual duties that need human intervention. In the process of adopting automation, confidentiality and the integrity of data should be maintained and emphasised.
- With the RPA evolving, new technologies should be adopted to indirectly affect the efficiency and effectiveness of RPA such an Artificial Intelligence and Machine Learning.

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