THE FUTURE OF ROBOTICS PROCESS AUTOMATION IN SHIPPING LINE BUSINESS TO ACHIEVE BETTER CUSTOMER SATISFACTION

by

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DISSERTATION

Presented to the Swiss School of Business and Management Geneva

In Partial Fulfillment

Of the Requirements

For the Degree

DOCTOR OF BUSINESS ADMINISTRATION

SWISS SCHOOL OF BUSINESS AND MANAGEMENT GENEVA

DECEMBER, 2024

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Dedication

This dissertation is dedicated to everyone passionate about making and playing games, and to those who have the determination and courage to pursue their dreams.

Failure may come, raids may wipe, but rezz, mana up, and try again.

Lok ’tar Ogar!

Acknowledgements

There have been a lot of people in my life who have come and gone, and a few who have stayed through the high and lows. This dissertation would not have been possible without a lot of great people guiding and supporting me through the years.

My family is my biggest strength: my wife, Prathana, and my children Om & Sara give me reason to continue to try to push myself.

To my parents, who gave me freedom to choose my path very early on, let me deal with challenges and consequences, while still always having my back when I needed them.

To my uncle Mr. Sunil Jadhav, who has been a friend, mentor and a source of a get-real reality check.

To my guide, Abhijeet Natu who was one of my first mentors, a fount of knowledge both tech and business, and helped me through the years with refreshing honesty.

To my friends, Shriram, Pritam, Sushant and Nimesh who've been each supporting me for two decades through the good and the bad.

To everyone else who have been helping me realize the good and bad parts of life, and that nothing is permanent. And lastly, but definitely not the least, my guide and DBA mentor, DR. Vijayakumar Varadarajan who has been a constant source of guidance and inspiration,

Thank you. This would not have been possible without any of you.

ABSTRACT

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2024

Dissertation Chair: <Chair's Name>
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This research is being conducted to explore and understand the global Shipping lines business, their customer-facing issues, and how they can be satisfied with the service by using the Robotic Process Automation (RPA) tool. This study aims to explore the implementation and impact of RPA in the shipping industry, focusing on operational efficiency, customer satisfaction, and organizational challenges related to its adoption. In this study, survey-based quantitative as well as qualitative approaches were employed, gathering responses from professionals in the shipping industry. The study analyzed the adoption rate of RPA, its influence on productivity, and the perceptions of its benefits and challenges. In this study, the data collection involved self-structured questionnaires and interviews with the respondents. The collected dataset was analyzed using statistical methods such as frequency analysis and one sample chi-square through SPSS (Statistical Packages for Social Sciences), while thematic analysis was used to analyses the qualitative

data. The study finds that overall, RPA has a positive impact on organizational throughput by eliminating mundane clerical work that includes, but is not limited to documentation, shipment tracking, and invoicing. It also benefits customer satisfaction since customers are presented with real-time information and reducing errors. Still, there are several difficulties, including the high costs of initial preparations, the negative attitudes of employees, and the requirement of leadership engagement. The study indicated that integrating RPA with other superior technologies, such as AI, can expand its benefit, but most firms have no definite plans for how to implement these interconnections. So, although RPA has many benefits for enhancing the work and helping clients in the shipping industry, its use is bounded by implementation challenges. Looking at leadership awareness, the issue of employees' resistance and the AI technology assimilation are important. Hence, based on the current research, the following suggestions are proffered with regards to how the shipping companies can further enhance the utilisation of RPA to achieve better utilisation returns and effectiveness, Evaluation and involvement of leadership, Training of its workers, Other AI applications that can augment the value of RPA and generate better Returns On Investment (ROI).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviations	**Full Form**
RPA	Robotics Process Automation
BDA	Big Data Analytics
IA	Intelligence Automation
IMO	International Maritime Organization
SE	Social Entrepreneurship
AS	Autonomous Ships
CFS	Container Freight Station
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
CSSC	Container Shipping Supply Chain
BDI	Baltic Dry Index
OCR	Optical Character Recognition

CHAPTER I:

INTRODUCTION

1.1 Introduction

In this fast-moving technical world, “Robotics Process Automation” (RPA) is emerging all over the world very rapidly and making human efforts easy and faster. According to Cernat et al. (2020) and Lacity et al. (2015) is a system that simulates human performance of repetitive, utilizing software robots, or bots, to perform rule-based activities in a business process. Robots or pre-programmed computers may now record and understand applications that deal with transactions, data modifications, reactions, and system interactions—all without human intervention. Regarding automation methods, RPA bots function at the application's front end (Lacity *et al.*, 2016). Most Industries are presently utilizing RPA technology. Some of the fields where Robotics bots are showing commendable efforts are Data Entry, Invoice processing, Report generation, Order Processing, Inventory Management, and Customer Service so; after seeing this technological enhancement, we planned to give attention towards the future of Robotics Process Automation in Shipping. AI is expected to lead the future of RPA as it will take significant issues to function in this aspect. RPA has been implemented for different industries, one of which is Shipping Industries. Different applications exchange the data through digital procedures, which may be automated with RPA and are just as important to Shipping line business to improve productivity & reduce manual Effort.

Research background and scope

This research deals with the new probabilities of AI and its possible uses in the field of shipping industries. The shipping line sector has long been seen as a non-competitive one where a few powerful players have used conferences to settle on prices and divide up routes. However, the market for liner shipping has undergone structural changes that have

compelled shipping companies to prioritise effective operation management. Nowadays, transportation firms operate in dispersed markets with many players who aren't afforded price protection. The customer is therefore presented with numerous crucial options to select from among the superior services offered by various shipping companies. In recent years, the already fiercely competitive liner shipping industry has seen more difficult business conditions. Maintaining current clientele and attempting to draw in new ones are essential for the liner industry. The quality and experience of the service are two key components of service marketing. Interactions between the consumer and a third-party agent or service support are referred to as service encounters (MICHAEL D. HUTT and SPEH, 2010). Customer happiness, loyalty, and propensity to buy are all impacted by the customer's evaluation of the service they received during these occasions (Lagrosen and Svensson, 2006). The degree to which the service satisfies the client's expectations throughout the service process determines how well the customer feels about the service according to its quality (Durvasula, Lysonski and Mehta, 2002; Lagrosen and Svensson, 2006). This study aims to introduce how RPA solutions will improve the customer experience.

Around the beginning of 2000, term RPA started to gain popularity. RPA is a computer software setup that substitutes humans in performing tasks, however, the name sounds like a physical robot that does human activities. Bataller et al. (2017) describes RPA as a way to automate operations that were previously performed manually. It includes a system, tools, and computer programs that are stored in computer memory. Per Intelligent Automation Industry Survey Report this survey report was prepared based on over 400 intelligent automation, RPA & Digital Transformation Leaders from different industries. Customers, as well as employees and investors now expect companies to be agile, capable enough to roll out new services and capabilities as Market demands. Survey shows

companies are not slowing down when it comes to RPA, Intelligent Automation, and Cognitive computing. Accordingly, Intelligent Automation 2022 annual report, 46% of industries already investing in business transformation, 37% of industries are planning to invest, while RPA solution is top of automation solutions.

Robotic Process Automation

RPA is the automation of human-like service procedures (van der Aalst, Bichler and Heinzl, 2018). The procedure is automated by using AI workers or software robots that can accurately perform repeated activities. By setting variables and somehow recording the screen, task instructions are established by the developer. These include logging onto applications, filling out forms, opening emails, and copying and pasting data (Asquith and Horsman, 2019). According to Van der Aalst et al., RPA is a general term for tools that alter other computer systems' user interfaces (van der Aalst, Bichler and Heinzl, 2018) The primary role of RPA is element identification, not screen coordinates, even though conventional process automation methods such as screen recording, scraping, and macros all depend on the computer's user interface. Asquith & Horsman (2019) or choices for XPath. Generally speaking, this offers a cleverer way to engage with the UI. The demand for RPA tools from commercial vendors has increased since 2016 van der Aalst, Bichler and Heinzl (2018), Some studies claim that these tools are used to automate audits Moffitt, Rozario and Vasarhelyi (2018) digital forensics Asquith and Horsman (2019) and industry (Madakam, Holmukhe and Kumar Jaiswal, 2019). The fourth industrial revolution, known as Industry 4.0, is creating new opportunities for using RPA tools on data from smart devices to automate standard rules-based business procedures (Madakam, Holmukhe and Kumar Jaiswal, 2019). RPA is the transfer of repetitive tasks from a human worker to a robot in corporate operations (when such jobs are executed rapidly and profitably). The goal is to use automation to externally replace people. Since RPA resides on top of the

information infrastructure rather than as part of it, it is less invasive than traditional methods. Enriquez et al. (2020) Maybe reduce spending. RPA technology can reduce the operational costs of transactional operations inside shared services by 30% to 50%, according to certain statistics (Williams and Allen, 2017).

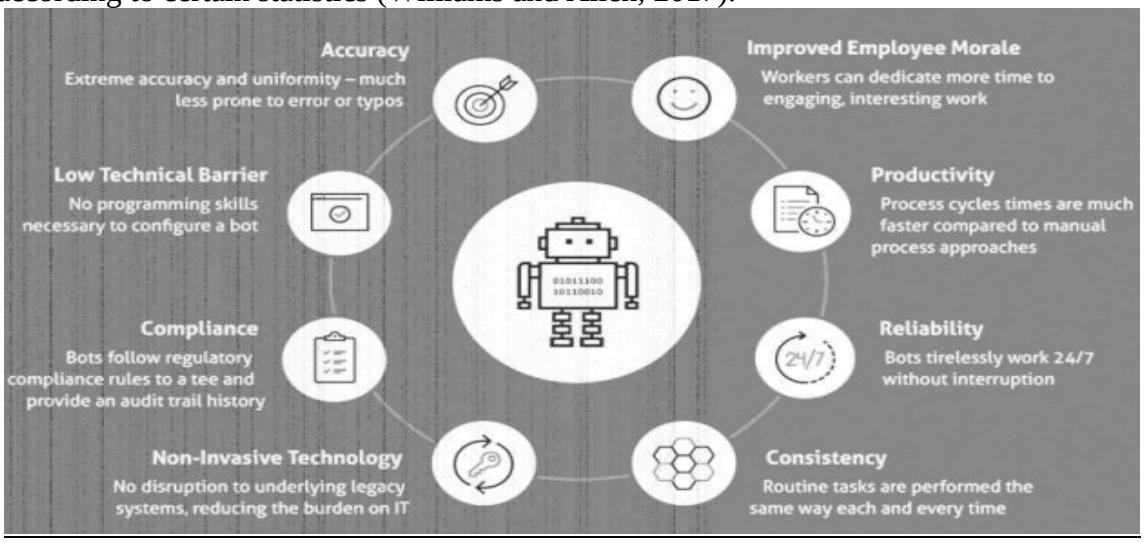

Figure 1.1: Robotic Process Automation, by Brandon Buccowich.

Source: - *(Sadastech, 2023)*

Implementation of Robotic Process Automation (RPA)

It is possible to implement RPA in the entity following these steps:

- **The redesign of business processes:** RPA is accomplished by the coding of current business procedures. On the other hand, some corporate procedures might eventually become obsolete or superfluous. Sometimes workers begin to perform corporate duties in ways that deviate from established policies. For whatever reason, the business processes that are going to be coded must be re-examined. Certain procedures can require optimisation or removal. Subsequently, the established and approved policies undergo simplification and reform.
- **Choosing the software:** Selecting a platform with automation capabilities is essential. It is necessary to manage the information that comes from many sources.

- **Automate the redesigned business processes:** The updated business procedures have been coded.
- **Facilitate the use of the new application:** To utilize the new RPA software, staff members must receive training.

RPA Benefits

An organization seems to benefit from the successful integration of these digital personnel.

The most frequently cited advantage in the surveys was that RPA could handle more boring and allow staff members to focus on more complex, repetitive jobs, valuable initiatives that increased the company's worth (Kaya *et al.*, 2019).

Another advantage was that employees would spend more time acquiring new skills to enhance their educations for their specific role as a result of taking on new or more rewarding responsibilities. RPA's ability to handle tedious and repetitive jobs also helped to reduce mistake rates by removing human error. Since bots don't get fatigued like people do, they are less likely to make same mistakes (Ketkar and Gawade, 2021). On the other side, inadequate RPA programming can lead to systematic errors in automated procedures. (Gotthardt *et al.*, 2020).

The findings highlight enhanced customer satisfaction and service. Some reasons contributed to this benefit, including quicker and more seamless process execution, which allowed for quicker responses to customer demands and less pressure on staff to rush through client contacts Parker and Appel (2021). Cost reductions allowed for process efficiency, which was a quantifiable benefit of successful implementations; studies reported that this benefit ranged from 25% to 75%. (Wewerka, Dax and Reichert, 2020; S. Wojciechowska-Filipek, 2019), and through the reduction of process time, with businesses reporting that certain procedures would take a tenth of the time previously. (S.

Wojciechowska-Filipek, 2019). In addition to increasing the efficacy of commercial procedures, the articles also demonstrated how bots may operate at any time. Consequently, not only do procedures take less time, but there is also more time available to finish them. (Viale and Zouari, 2020). The majority of businesses that adopted RPA also experienced the ancillary advantages of process improvement and standardization. To integrate this technology, a study must be standardized and structured, and processes must be established and developed. Consequently, it is reasonable to define standardization as a benefit arising from the intention to implement RPA (S. Wojciechowska-Filipek, 2019).

Other effects of these digital workers included a 40% decrease in the cost of office space. more effective at handling staff absences since RPA could do repetitive, basic activities, reducing the need for redistribution of labour and enabling more remote work and less office time. as well as business continuity in the face of unforeseen circumstances like COVID-19 (Siderska, 2021).

RPA Challenges

The application of RPA is lacking in experience and expertise due to its recent inception (Wewerka et al., 2020; Gotthardt et al., 2020). In addition to having trouble identifying the best solutions for their circumstances, businesses frequently face internal opposition to embracing new cultures. One illustration would be the employees' ignorance about the potential effects of this adoption on their work (system, document structure, etc.) (Marciniak and Stanisławski, 2021).

A lack of knowledge and skill with this program causes cultural resistance to change to arise. First of all, adherence was lower since some workers avoided using the new technology unless it was required of them for fear of losing their jobs (Fernandez and Aman, 2021). Second, because they were accustomed to the prevailing work cultures, several stakeholders did not support and prioritise this adoption (Viale and Zouari, 2020).

The deployment of RPA is severely hampered by this collective lack of motivation and willingness to innovate.

Some businesses are still falling behind, even though the majority have begun to adopt digital documentation as a more adaptable and contemporary method of storing information. The implementation of RPA in businesses is still significantly hampered by the use of study and unstructured documents. (Wewerka, Dax and Reichert, 2020).

Companies need to have digitally saved organized documents to automate any business process. For the deployment of these digital workers to be successful, it is essential to comprehend which processes can be automated. On the other hand, it appeared that trying to automate unsuitable procedures was a persistent problem in all businesses. Businesses suffer from systematizing manual, complicated, or highly fractional tasks (including several parties) because they lack the necessary skills and planning. The best course of action in these situations seemed to be to either restructure the process or select a more suitable process for automation.

Concerns about access and security are equally important when implementing RPA. Resource allocation has always been a human responsibility. On the other hand, software robots necessitate fresh approaches that take into account the way robots can access data(Raza et al., 2019; Schuett, 2019). Just as it is very difficult for organizations to effectively integrate a new security framework, existing security procedures fail to account for digital workers (Kokina *et al.*, 2019). There aren't any standards or procedures in place for RPA just yet because the software is so new and there isn't enough documentation to help businesses use it (Zelenka and Vokoun, 2021).

Robotic Process Automation Operations

As of right present, RPA does not have any established standard operating models. But here's an example of RPA in action, courtesy of Mr. Kristina Romero and his technical

team at San Diego's M/s. Info Cap Networks LLC (Info Cap). Automating hitherto time-consuming, labor-intensive, and prone to human error content-enabled business processes is the goal of this technological mode (Romero, 2017). Here, "Digital Labour" that helps reduce mistakes, cut costs, and remove hazards is a key perk. The RPA offers numerous practical benefits to diverse and interdisciplinary organizations.

Figure 1.2: RPA Operations,

Source: - *(Romero, (2017).*

- **Credible Business Transformation:** New RPA technologies will have a profound impact on how businesses operate. With help of RPA, businesses can now significantly increase their labour efficiency by supplementing a more sustainable workforce with digital labour that is dependable, efficient, and inexpensive. As a result, businesses can cut expenses, improve accuracy, and eradicate danger.
- **Content Migrations:** The amount of content being generated by all of these organizations is massive. The increasing complexity of insights in everyday operations means that additional manpower may be needed to gather data, analyze it, and then provide a report. With the utilization of RPA, businesses and

organizations can streamline the process of application consolidation and integration with legacy applications. This is achieved through the efficient migration of content or connection to legacy systems.

- **Web Crawling / OSINT:** Automating the capture of content from any source and in any format using a variety of devices is the goal of RPA. Various forms of text, images, music, and video can be used. There are three possible formats for the data: structured, semi-structured, and unstructured. By utilizing DL techniques, this RPA system can retrieve data from the deep web. The mining process will also be finished with the aid of web analytics, AI, and "Big Data Analytics" (BDA).
- **IT Department Enabler:** Robots in RPA are defined as "software programs that mimic human-computer interactions and execute a repetitive process, rules-based tasks like gathering and comparing data from multiple systems, reading and writing to databases, or extracting and reformatting data into reports and dashboards," as stated in his blog. The software, monitoring of hardware, and networking are under their watchful eye to resolve any deviations and ensure smooth operations.

1.2 Research Problem

The maritime shipping industry stands as the backbone of international trade, facilitating the movement of over 75-80% of global cargo. However, amidst its pivotal role, the industry faces multifaceted challenges that demand innovative solutions to enhance operational efficiency and maintain competitiveness. Factors such as evolving trade regulations, geopolitical tensions like the US-China trade war, dynamic fleet deployment strategies, and recent disturbances caused by COVID-19 pandemic have accentuated the need for transformative measures. In this context, the integration of RPA and AI presents a compelling opportunity for the shipping sector to streamline operations, optimize resource utilization, and elevate customer satisfaction.

Challenges Confronting the Maritime Shipping Industry:

The contemporary landscape of maritime shipping is characterized by a myriad of challenges, each posing distinct impediments to operational effectiveness:

- **Trade Regulations and Geopolitical Dynamics:** The imposition of trade tariffs and regulatory changes, exemplified by events like the US-China trade war, disrupts established trade routes and necessitates agile adjustments in shipping operations.
- **Fleet Deployment Strategies:** Efficient fleet deployment is critical for maintaining service reliability and optimizing operational costs. However, fluctuating market demands, vessel capacities, and geopolitical uncertainties pose challenges in strategic fleet management.
- **Competition and Strategic Alliances:** Intensified competition within the shipping industry, compounded by the formation of strategic alliances among shipping lines, underscores the importance of differentiation and value creation to retain and attract customers.
- **Influence of COVID-19:** The COVID-19 pandemic has ushered in unprecedented disruptions, including port closures, supply chain interruptions, and crew management challenges, further exacerbating operational complexities.

1.3 Research Purpose

The principal aim of this thesis is to study how the RPA technology will improve the productivity and efficiency of Shipping Liner business to get better customer service. I have concentrated specifically on the Shipping Liner industry with a concrete vision of improving Customer service, reducing repetitive tasks, reducing costs and providing higher customer satisfaction with limited resources.

AI – RPA is the latest technology that will fulfil the requirements of shipping industries to improve customer satisfaction. It will reduce the repetitive tasks of operation & increase efficiency and production by allowing employees to focus on more productive duties rather than repeated tasks. Shipping industries have a very large scope of opportunity to implement the RPA in different departments i.e. Documentation – Export & Import, Operations – Equipment Management, Finance – Accounts payable & Accounts receivable, Customer service, Trade Management, and Human Resources.

We believe that Customer service with faster response and accurate information can be achieved with RPA. This will lead to eliminating the repetitive work performed by Humans and allow them to work more productively. There is a clear vast opportunity for RPA to improve customer service in Shipping Business Industries. Current Customer service practices followed in Shipping industries must improve through technologies. These will reduce the manual & repeated tasks performed in Maritime business, especially Documentation, Finance, Logistic departments. RPA gets rid of tedious human data copying and pasting across almost any application or data source, including portals and websites, desktop apps, and enterprise systems.

1.4 Research Purpose and Objectives

The purpose of this thesis was to analyze the way Shipping Lines serve Customers, identify the customer needs & how customers perceive service delivery. Identify the gap in those service deliveries and fill those Gaps using technology of RPA. RPA appears as a transformative technology poised to address operational inefficiencies and enhance the competitive edge of maritime shipping companies. RPA entails deployment of software bots to automate repetitive tasks and streamline workflow processes, thereby liberating HR for more planned and value-added activities.

Key benefits of RPA implementation in the maritime shipping industry include:

- **Workflow Automation:** RPA makes it possible to automate repetitive processes like data entry, document processing, and goods scheduling, leading to accelerated process execution and enhanced operational agility.
- **Enhanced Accuracy and Compliance:** By minimizing manual intervention, RPA reduces the likelihood of errors and ensures adherence to regulatory requirements, thereby mitigating the risk of penalties and operational disruptions.
- **Real-time Data Processing:** RPA facilitates seamless integration with existing IT systems and data sources, enabling real-time data processing and analytics for informed decision-making and proactive management of operational challenges.
- **Scalability and Flexibility:** The scalability and flexibility inherent in RPA solutions empower shipping companies to adapt to evolving business dynamics, scale operations as per demand fluctuations, and maintain cost competitiveness.

The most important takeaway is that four Service Quality measures adequately characterize liner shipping Service Quality. They are value, responsiveness, speed, and reliability, in that order, and their impact on customer satisfaction, from highest to lowest. Customers are more likely to be satisfied if they can rely on and receive their service quickly. The most important takeaway is that four Service Quality measures adequately characterize liner shipping Service Quality. They are value, responsiveness, speed, and reliability, in that order, and their impact on customer satisfaction, from highest to lowest. Customers are more likely to be satisfied if they can rely on and receive their service quickly. They mostly consist of key indicators linked to a company's service effectiveness (Yuen and Thai, 2015).

There have been several studies carried out about RPA impacting other industries like Health- Care, Logistic, Banking but no studies has been carried out about Shipping liner business till date.

To achieve the aim of this study there has been selection of objective that has been set-

- Explore how the other industries implemented the RPA successfully.
- What the customers' expectations from a Shipping Line service.
- How to achieve the customer satisfaction in Shipping liner industries by giving fast service with accurate information
- Identify the advantages and disadvantages of implementing the RPA in the organization.
- What organization employees say about the RPA.

The section of research methodology has been detailed how the data will be collected and the sample of study will be structured.

1.5 Significance of the Study

The Purpose of Research is to automate the different processes of Shipping Industries using the Robotic Process. The Goal here was not to replace RPA with staff but to add more business value to their customers. Make Staff more Productive, and reduce the repetitive work in Shipping Documentation & Customer service Processes. Finally, provide better customer services to Shipping Industries directly impacted Customers like Shipping, Consignee & Notify. Also, Indirect customers like Ports, container Freight station Terminal & logistic companies.

According to the KOFEX report, AI can automate tasks at a fraction of the human comparable cost, resulting in immediate savings of 25% to 50%. Consistently provided data that was 100% accurate while increasing staff productivity, service level, and capacity by 35% to 50%. Quicker responses to customers and companies are possible. Additionally, it offers analytics and insights to help you better understand your processes and enhance your operations. Cuts processing times in half, on average, and by as much as 90%.

Supporting factors that analyses the shipper's perception and experience before and after a customer service performance make up responsiveness. Shippers' perceptions of a company's image, as well as their interactions with its workers and systems. Customer expectation increased demand for Products and delivering consistent, high quality Customer experience across multiple modes of channels.

This further highlights the importance of RPA. Shipping Line can automate the manual task to perform by BOT to avoid delay to perform the task. BOT can read the Request received, from Customer through Email, EDI, Web etc… and provides the appropriate response in the given SLA.

The convergence of AI & "Intelligence Automation" (IA) with RPA augments the capabilities of automated processes, enabling cognitive decision-making and predictive analytics. Finally, one area that my estimation may not be gathering in RPA is we can further enhance RPA using AI–cognitive computing to make decisions by RPA on its own based on history records / Issues Steps performed by Users. RPA systems driven by AI utilized NLP and machine learning techniques to emulate human cognitive functions, thereby enhancing operational intelligence and customer engagement. Key applications of AI in maritime shipping include:

- **Intelligent Document Processing:** AI algorithms facilitate the extraction and interpretation of information from unstructured documents, such as bills of lading and customs forms, streamlining document processing workflows and expediting cargo clearance procedures.
- **Predictive Maintenance:** Optimizing maintenance schedules and reducing downtime are two outcomes of AI-driven predictive maintenance models that assess sensor inputs and historical data to predict equipment breakdowns.

- **Dynamic Routing and Fleet Optimization:** AI algorithms optimize vessel routing and deployment strategies based on real-time factors such as weather conditions, port congestion, and fuel prices, enabling shipping companies to maximize operational efficiency and reduce fuel consumption.
- **Customer Engagement and Personalization:** Customer service capabilities are greatly improved by AI-powered chatbots and virtual assistants. These tools offer adapted help, answer questions, and ensure smooth communication throughout the shipping process. As a result, customer happiness and loyalty are increased.

Industries based analysis based on activity involved in Transformation –

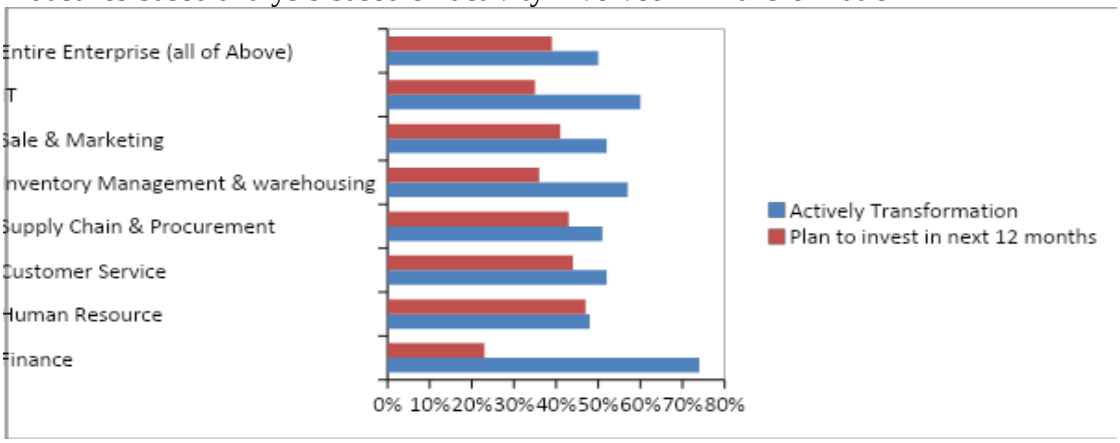

Figure 1.3: Significance of the Study

Source: *- (Pinto et al., 2010)*

Despite these, the shipping industry faces several difficulties in keeping its customers. the idea of customer-focused service that center on comprehension of demands. Inaccurate information supplied with customers or a lack of timely response to their inquiries can cause unhappiness and ultimately result in the loss of key customers and business. Thus, in the shipping industry, knowing the needs of the consumer is essential.

This study looks to abstract the traditional business practices followed in shipping industries and adopt the new AI technology i.e. Robotic processing automation and show

how it will improve the customer service in different departments of Shipping line business and get better ROI (Return of Investment). Also, allow existing employees to reduce their repetitive task performed daily and utilized them in productive work.

1.6 Structure of the Thesis

The thesis is divided into six (6) major chapters.

- **Chapter One** examines the study's context, background, and scope in the introduction of the research. This section elaborates on the research challenge, aims, significance, and purpose.
- **Chapter Two** synthesizes the findings from the researcher's examination of relevant literature. Finding the gap in the current literature, highlighting key research, and identifying relevant large works are all tasks that this section undertakes. This research aims to narrow or eliminate that disparity.
- **Chapter Three** addresses the methodology used in this study. The numerous ideas of qualitative research and data collection that informed this study will be covered. This part will also shed light on the nature and process of developing the semi-structured interview questions.
- **Chapter Four** details the study's key findings and the actions that companies may take to capitalise on them.
- **Chapter Five** provides a Discussion of this research findings. This will also include the final answers of this study’s research questions
- **Chapter Six** includes the study's conclusions, potential limits, caveats, practical uses, and suggestions for future research.

CHAPTER II:

REVIEW OF LITERATURE

2.1 Introduction

The purpose of this literature evaluation is to demonstrate the lack of analytics approaches in the Shipping Business and importance of “Robotic Process Automation” (RPA) to improve Customer service in the Shipping Liner business more efficiently. When reviewing the literature, it becomes soon clear that research studies in Shipping Industries to improve Customer satisfaction using RPA.

This Literature review covers mainly two main areas: Firstly, research how other industries have implemented RPA successfully. Secondly, how to achieve customer satisfaction in the Shipping Industry using Robotic Process automation by giving Fast service with accurate information.

2.2 The current state of the Shipping / Maritime Industry

The marine industry is one of the greatest polluters of the air and water, especially given the speed at which oceanic logistics are developing. The primary aim of Koilo, (2019) is to analyse the main issues confronting the shipping industry and the main terms used to describe the sustainability problems in marine transportation. Analyzing the existing sustainability frameworks, this study delves into connection between sustainability and the maritime industry. To quantify the connection between services exports, exchange rates, oil prices, and value-added to maritime transport, research also suggests using modelling techniques. Value-added growth in ocean transport is negatively impacted by the pace of increase in crude oil prices, according to empirical results. It is also evident that oil industry has a significant influence on competitiveness and value creation of marine clusters, particularly in the shipping industry. Through Norway's validation of the EKC hypothesis, the analysis further clarifies the effects of the link between environmental

contamination and marine cluster activity. A recent study shows that the association between CO2 emissions and economic development is inverted U-shaped. The empirical evidence indicates that there are stronger correlations between CO2 emissions and the value added to ocean transport than there are between energy consumption indicators. Energy consumption's effect on the environment renewable energy has likely diminished as a result of the maritime industry's technological leadership and energy efficiency policies.

According to the Mordor Intelligence Report, Container Shipping Market – Share, Size, & Growth Analysis (mordorintelligence.com), From 2024–2029, the market is expected to expand from an anticipated USD 116.04 billion to USD 134.03 billion, representing a compound yearly growth rate (CAGR) of 3.11%.

Figure 2.1: Container Shipping Market

Source: *- (Intelligence, 2024)*

Shipping giants Maersk, MSC, CMA, COSCO, and Hapag Lloyd are among the leading companies in the market. The global shipping container industry is anticipated to rise steadily because of increased seaborne trade and global industrialization.

Increased demand for ship-based cargo transportation and an expansion in trade-tied agreements are driving the growth of the shipping container business. Additionally,

changes in the price of storage and transportation have an impact on the market's growth for shipping containers. However, factors including the anticipated move toward automation in shipping and higher maritime safety regulations will propel the market's growth prospects over the forecast period.

According to 30% of respondents, the two biggest investment trends are planning and technological investments. The list also included process automation (18%), collaboration and networking (27%), and real-time visibility and tracking (24%).

Tadros, Ventura and Soares (2023) examine the many technologies, current rules, and decision-support methods used by the marine industry to ensure fleet's sustainability. In particular, the years 2010–2022, the most recent four, are considered. The 2050 plan aims to increase the energy efficacy of the fleet to reduce ship resistance and onboard energy needs, influence fuel consumption, and achieve a smooth changeover to green shipping by preventing the transportation of dangerous species worldwide and increasing energy efficiency across the fleet. Ship operation, power systems, innovative clean fuels and treatment systems, hull design, and propulsion systems all employ different technologies. The outcomes of this study help to map the scientific knowledge of each maritime technology, identify pertinent issue areas, visualize the connections between themes, and highlight research opportunities and gaps. To provide more practical solutions for sustainability, this review aids in presenting holistic approaches in future research that enable collaboration between stakeholders in the marine industry.

Halff, Younes and Boersma (2019) When discussing "peak oil demand," passenger cars are frequently discussed from a US and European standpoint. If oil consumption were to reach a tipping point, these debates frequently overlook other areas, such maritime transportation, which collectively would also need to demonstrate a decline in demand. The outlook for marine bunkers, a specialised industry that may make up as much as 7%

of the demand barrel, is examined. Against the backdrop of previous innovations that have been changing the fuel consumption patterns of ships, we examine the potential effects of new environmental regulations that seek to significantly reduce "sulphur oxide" (SOx) emissions from ships as of January 2020. We also evaluate the likely effects of these regulations on future innovation in the ship industry. We conclude that the regulations may, ironically, actually slow down the shipping industry's potential shift away from conventional bunker fuels. However, the regulations would hurt heavy, sour crude oil producers and simple refineries, whose prices are sometimes linked to those of "high Sulphur fuel oil" (HSFO).

Gavalas, Syriopoulos and Roumpis (2022) The COVID-19 pandemic has deepened environmental and digitalization trends that were already in place. The pandemic's notable effects on the maritime sector include a shift in the industry's perception of technology. In the sector, digital solutions are getting more popular and widely accepted. The influence of digital technologies on shipping businesses' efficiency is the focus of this study. Additionally, it will shed light on how industry shareholders can get advantages from data solutions to enhance operative decision-making. Utilizing firm-level data from across the nation, they evaluate the effects of digital adoption on maritime industry efficiency. Although not to the same degree among shipping companies and divisions, the results offer solid evidence that operating in a digitalised ecosystem can increase productivity. Compared to storage and support activities for transportation, the effects are comparatively greater in water transportation activities. Digital technologies could contribute to the increasing efficiency diffusion among transportation companies.

Wan et al. (2018) Since global freight volumes are increasing, ship-source "greenhouse gas" (GHG) emissions could rise by as much as 250% by 2050 compared to their 2012 levels. The lack of binding international legal arrangements to regulate GHGs

is a result of the high cost of technical solutions and the absence of vital industrial assistance. The “International Maritime Organisation” passed Resolve A.963 (23) in 2003 to control CO2 emissions from shipping using market-based, operational, and technical means. However, there is no clear action plan or specific emission reduction target, and progress has been sluggish and unclear. A complete roadmap, however, might not even appear until 2023. The advancement of operational, technical, and market-based routes, as well as the related disputes, are reviewed in this policy analysis. Despite its good intentions, they contend that 1) a performance-based index has flaws that hinder significant CO2 emission decreases brought about by technological advancements; 2) slow steaming is the most effective operational solution for reducing energy consumption due to its immediate and evident results; however, due to its relatively poor speed in practice, this single source has little ability to reduce emissions; and 3) ultimately, a market-based strategy is needed to solve The shipping industry has a 50/50 chance of making a fair and proportionate involvement to keeping global warming below 2 °C if drastic emission reductions happen soon.

Ichimura et al. (2022) Several cutting-edge technologies are linked to the so-called Industrial 4.0 which is also known as Industry 4.0 in the broader literature. Advanced applications like cloud computing, AI, BDA, and IoT are indicative examples in this category and are already influencing the maritime sector. The fact that some autonomous ship construction projects, such as the "Autonomous Spaceport Drone Ship" (ASDS) and the Yara Birkel, rely significantly on technology related to the Industry 4.0 concept is suggestive of this. A new operating paradigm, sometimes referred to as "shipping in the era of digitalisation," is already being adopted by the maritime transportation sector. As the maritime industry's future, shipping corporations advocate for digitalisation, and they are actively working to establish plans. Looking at the maritime industry's goals and

strategies in the context of digitisation might shed light on its current trajectory. By conducting a qualitative examination of relevant action plans collected online from shipping companies, this research seeks to identify the plans' characteristics, with a particular emphasis on key commercial participants in the marine industry. Notably, many shipping companies have embraced digitisation to meet customer expectations, increase competitiveness, and save expenses.

Mallouppas and Yfantis (2021) This research study looks at the potential technologies and routes that could assist the shipping industry meet the deep decarbonization goals set by the "International Maritime Organization" (IMO) by 2050. Important stakeholders are now more interested in deep decarbonization, according to market research done by Shell and Deloitte. However, considering that the maritime industry contributes about 3% of greenhouse gas emissions, deep decarbonization will necessitate financial incentives and regional and global policy. Based on research studies and grey literature, evaluation study addresses techno-economic issues and/or advantages of technology that will assist the shipping industry in meeting IMO targets. It covers operational and technical ways to reduce fuel consumption for both new and including slow steaming, old ships, cleaning and waste heat recovery, coating, hull and propeller design, and renewable energy sources like solar, wind, and biomass. It also discusses the current state of technology like fuel cells and internal combustion engines, as well as alternative fuels like ammonia, hydrogen, nuclear power, and methanol. Financial incentives, social pressure, and legislative and regulatory reforms at the local, regional, and global levels will help bring about the technological revolution necessary to achieve the IMO's 2050 targets.

Wang et al. (2020) A global agenda known as the "Sustainability Development Goals" (SDGs) seeks to encourage action towards social, environmental, and economic sustainability. The global maritime sector is one of the major players and contributes

significantly to sustainability on a worldwide scale. Using the idea of "social entrepreneurship" (SE), this study intends to investigate (1) the basic and extended obligations (SDG 1–SDG 16) and (2) the possible value chain collaborations (SDG 17) about SDG operation in the maritime sector. To do this, they do a contented analysis of sustainability reports that terminal operators and container shipping lines released between 2016 and 2019. To be more precise, text content of sustainability reports is categorized using manual text categorization based on the 17 SDGs. Involuntary text mining is then used to further identify important responsibilities that the maritime industry plays about each SDG. The proposal of a single framework indicates a range of motivations and degrees of comprehensiveness in the maritime industry's sustainability initiatives. This framework provides insight into the theoretical process of the maritime industry's shift towards sustainability from a SE standpoint. It also has administrative ramifications for maritime industry's resource allocation plans to achieve the SDGs.

Czachorowski, Solesvik and Kondratenko (2019) One of the most polluting industries in world is the maritime sector. In this study, they offer new perspectives on how innovative blockchain technology might be used to reduce pollution. After evaluating the most recent research on blockchain technology, we suggest applications for the maritime sector. Experts in the maritime sector are particularly interested in the potential applications of blockchain technology to increase the environmental efficiency of the sector. With its wide range of applications, the technology can be used to improve supply chain connectivity, exchange and display time-stamped proofed data, lower industrial operating expenses with middlemen, and boost security. Additionally, it facilitates Port State Control, Class Societies inspections, and audit agreement by providing complete visibility for all parties engaged with evidence of work. The study's findings also demonstrate that examples of blockchain applications in other domains raise industry interest in using them

in the maritime sector. Due to lower costs and friction, specialised third parties would enhance the likelihood of blockchain implementation and industry willingness. Scholars, decision-makers, and professionals in the maritime sector will find the study intriguing.

Munim et al. (2020) provide a bibliometric evaluation of 279 articles about the request of BD and AI in marine industry, written by 842 researchers and published in 214 scholarly journals. They used the R software's Bibliometric program to evaluate the bibliographical data we had taken out of the “Web of Science database”. They identified most significant papers, journals, authors, and organisations based on citation analysis criteria. They discovered four underlying research clusters using the bibliographic coupling methodology: (1) the marine industry's digital revolution; (2) AIS big data applications; (3) energy efficacy; and (4) predictive analytics. They conducted a thorough analysis of these clusters and derived potential research questions. Additionally, we offer networks of research collaboration at the research and institution levels.

Pu and Lam (2021) Amongst cutting-edge technologies that are poised to upend the maritime sector is blockchain. Blockchain use is being investigated more and more by maritime businesses to stay competitive. Nevertheless, research on blockchain requests in the maritime industry has been limited, with the majority of studies being sector-specific, such as the maritime shipping industry. The determination of this research is to offer an in-depth examination of blockchain applications from the viewpoints of numerous industries. Additionally, it seeks to provide a new conceptual framework that will direct future research and offer a comprehensive perspective on blockchain usage in the sector. The insinuations analysis of blockchain implementation shows that before implementing the technology, industry organizations must have a solid grasp of blockchain and its unique issues and needs. Government organizations can use blockchain technical code to regulate blockchain innovation in a way that is equivalent to using legal code. Finally, suggestions

are given to different maritime stakeholders on how to address pertinent concerns and take advantage of the new opportunities presented by blockchain.

Munim (2019) There have been some autonomous ship prototypes created in the past ten years. Norway is leading the way in the technological development of "autonomous ships" (AS), but the USA, China, and Finland have also made great strides. Potential business models and future AS applications, however, have not yet been thoroughly investigated. AS is anticipated to enter the commercial market soon, giving the merchant maritime sector a new facet. Thus, this study adds to the body of information in the maritime field by (1) reviewing the development projects for AS and advantages of AS from an economic, environmental, and community standpoint, (2) proposing creative applications of AS in conventional, arctic, and "short-sea shipping" (SSS), and (3) talking about possible business models from the viewpoint of AS constructors.

Overview of Shipping Business Cycle

Each shipping liner business Organization have their own requirements/rules and regulations and different services but Shipping Cycle Globally followed the same steps-

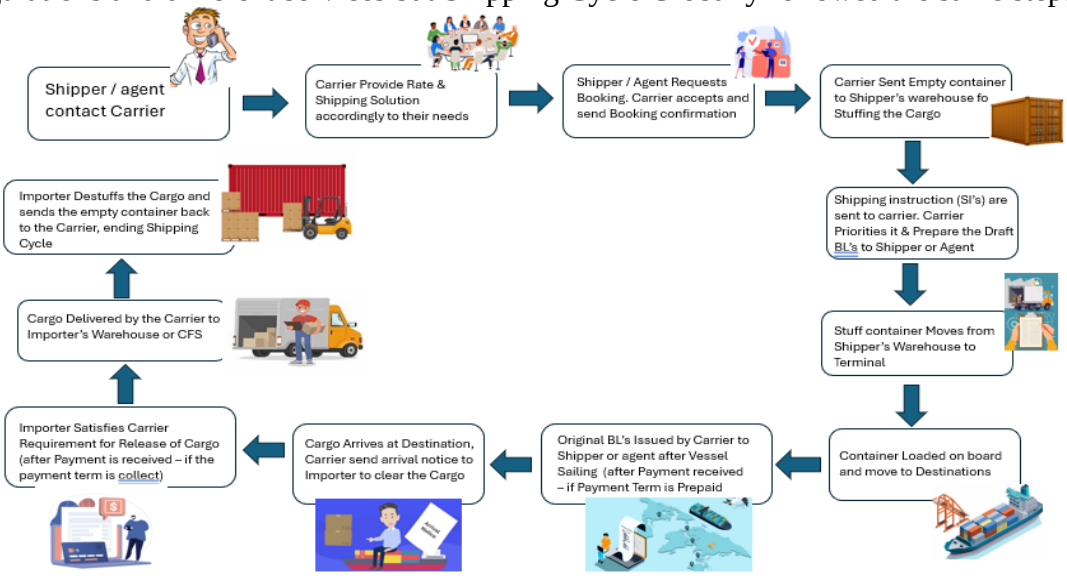

Figure 2.2: Shipping Business Cycle

Source: - *(Paridaens and Notteboom, 2022)*

The shipping business Cycle starts when shipper / Customer or Agent call to Shipping Line Office to Booking the Cargo to move the Shipment from one destination from another. Shipping Line (Maersk, MSC or CMA CGM etc.) will analyze the Customer requirement, understand their need & based on their past experience they will share the Rates & Shipping solution to Shipper or agent.

Once Rate has finalized, Shipping agent request booking confirmation to Shipping Carrier through Email or Carrier Web site. Carrier will accept the booking & send Booking confirmation to Customer. Carrier Sent Empty container to Shipper Warehouse to stuff the Cargo in the container. Shipping Instruction (SI's) are sent to carrier. Carrier Priorities it & Prepare the Draft BLs to Shipper or Agent. Once the container is stuff, Carrier moves the container from Warehouse to Port Terminal. Port terminals load the container on Vessel to move the container to next destination.

After the container loaded on the Vessel, Shipper will approach the Carrier to release the Original Bill of Lading. Shipping Carrier Issue the invoice to Customer, Once the Payment received for all Local and Carrier Charges (If Payment term is Prepaid) . Before the Vessel reach to destination, Carrier will issue the Arrival Noticed to Importer to clear the Cargo at destination within agreed Free days. Arrival notice contains Vessel ETA, Cargo Detail, Weight & Final place of Delivery. Once Importer is satisfied carrier Requirements for Release the Cargo after Payment Received from Importer (If Payment Term is Collect for Carrier & Local charges). Cargo Delivered by the Carrier to Importer Warehouse or Container Freight Station (CFS). Once Cargo destuffed by Importer Warehouse, Importer must deliver the Empty container to Carrier within agreed Free day else it imposed for Demurrage.

Yin, Wu and Lu (2019) Investors must focus more on their investing plans to survive at this time, as dry bulk shipping sector appears to have been in a lengthy phase of decline. Finding an appropriate model to evaluate dry bulk ship investment choices during peak and challenging times using real options theories was the goal of this work. Investors were given two choices—an abandonment option and a deferrable option—to indicate how they would respond to the unpredictability of investment operations, such as selling or stopping boats. Owing to data constraints, a binomial evaluation model was used to solve the option evaluation problem. In line with shipping cycle theories, "generalized autoregressive conditional heteroskedasticity" (GARCH) model was used to construct distinct volatility estimates for the peak and challenging times. The viability of the real options model was demonstrated by applying it to a case study involving the trade of used ships. The novel model outperforms the conventional "net present value" (NPV) approach in undefined investment contexts, per case study's findings. Thus, the findings show that the real options model is a better approach to apply in the dry bulk shipping industry of today.

Alexandridis et al. (2018) Since finance availability can affect a capital-intensive company's competitiveness and success or failure in challenging market conditions, financing shipping-related investment projects has long been a focus of discussion and investigation within the global maritime sector. For the first time, a thorough and organised review of all published studies on shipping financing and investment is presented in this study. Along with a few books and book chapters, the review covers over forty years (1979–2018) of empirical data, comprising 162 investigations published in forty-eight academic journals. The study shapes future research agenda in shipping finance and investment by providing a thorough synthesis and bibliometric analysis of the body of

existing research, making it a valuable resource for both business practice and the academic community.

Drobetz, Menzel and Schröder (2016) The influence of industry-level and macroeconomic factors on company systematic risk, or beta, in the global shipping sector is examined in this paper. In this asset-intensive and cyclical business, they record the degree of time-varying stock market betas. We also look at the basic factors that influence systematic risk. They discover that shipping stocks exhibit significant levels of systematic risk, which align with the industry's core risk attributes (e.g., high financial and operating leverage). Unlike the average firm in the S&P 500 index or firms from benchmark sectors, shipping firms show unique industry-specific beta characteristics. Variations in cross-section of enterprises and over time can be largely explained by changes in industry-specific risk variables as well as changes in the economy.

Song (2021) Utilizing a logistics viewpoint, this study gives a general high-level description of "container shipping supply chain" (CSSC), which includes all the important parts that make CSSC valuable, including logistics for freight, containers, vessels, ports and terminals, and inland transportation. To inspire further research, we take a look at the main planning concerns and potential areas of study in every logistics segment. Also included are detailed descriptions and discussions of digitalisation and decarbonisation, the two main obstacles to CSSC. They highlight the fact that ineffective operations are caused by the substantial CSSC fragmentation. A proposed route to digitalise container shipping calls for the utilized of digital technologies in some business operations spanning five logistics sections, as well as a shift in the attitudes and interactions of supply chain participants. They acknowledge that the decarbonisation of shipping is likely to occur in a variety of ways, with varying fuel/energy systems for ports and ships. This opens up more

possibilities for research and practical use in the exceedingly complex and unpredictable CSSC setting.

Feibert, Hansen and Jacobsen (2017) The maritime transportation sector works in a dynamic, competitive market with low freight rates and variable fuel prices. Therefore, shipping businesses need to implement cost-containing, responsive supply chains. This study explores the potential benefits of existing literature from the perspectives of business process management and integrated digitisation to improve supply chain performance for shipping businesses. The primary themes found in the literature have been grouped based on how well they help create supply chains that are responsive and effective. Additionally, the factors that contribute to improved supply chain performance have been determined, and a study program is suggested. Therefore, by encompassing existing literature and assisting decision-makers in their endeavours to establish approachable and adaptable shipping supply chains, this work advances the field of maritime transport research.

Yin and Shi (2018) Many scholars have been interested in shipping indices because they can offer insights into the future and represent the general direction of related seaborne markets. In addition to linked indices including “Baltic Dry Index” (BDI), "China Containerised Freight Index" (CCFI) has been receiving increased consideration. China, a major exporting nation with extensive industry, was selected to represent the container shipping sector using the CCFI due to its more compelling and representative data. There haven't been any methodical attempts to comprehend container freight seasonality trends. The consistent fluctuations over one year are revealed by seasonality patterns. Like the CCFI, they are found in time sequence that are monitored more than once a year. They examine CCFI to determine if container freight rates are stochastic or deterministic in its seasonality across various line services. This work fully solves the small sample problem using the Monte Carlo approach and HEGY method. Additionally, deterministic

seasonality is tested using seasonal dummy variables. It would appear that all of the container freight rates are non-seasonal with zero frequency unit roots, except the Japan service series, which has a half-year unit root. All the line service series have deterministic seasonality. Moreover, the equilibrium of supply and demand determines seasonality. The periodic law of freight rates applies under this assumption.

Drobetz, Haller and Meier (2016) examine the effects of cash flow shocks on shipping companies' financing and investment choices in numerous economic contexts utilizing a system of equations model. The economic crisis had a severe detrimental impact on the financing activities of even financially sound shipping companies. Nevertheless, these companies were able to raise their long-term debt. Banks evaded an industry-wide collateral channel outcome by internalising the influence of foreclosure decisions on vessel values. Financially fragile shipping companies underinvest even in a thriving economy because they can't raise enough outside funding. The pre-2008 crisis eras' conversion of long-term debt to short-term debt demonstrates that the makeup of financing sources, rather than the sheer magnitude of financing-cash flow sensitivities, is a better indicator of whether businesses are facing financial restrictions. The significance of financial flexibility is supported by an examination of businesses' surplus cash holdings.

Kagkarakis, Merikas and Merika (2016) An essential component of the global transportation sector, we model the demolition market. Utilizing a "Vector Autoregressive" (VAR) model, it is demonstrated that global steel argument prices have a significant impact on price discovery in the ship demolition sector. Their conclusion is clarified and ascribed to dependence on scrap metal imports in growth models of Southeast Asian nations, which are home to the majority of the ship-demolition market. Instead of recycling vessels, these are primarily sourced from wealthy economies. After that, they test our model's forecasting capabilities and apply it to ship demolition market price prediction.

They found that it offers decision-makers a practical forecasting tool that helps all parties—ship owners, recyclers, and cash buyers—to obtain important insights into the sector's underlying trends.

The Customer Satisfaction in Shipping/Maritime Industries

As per Ichimura et al. (2022), When it comes to client happiness, four businesses (CMA HMM, Evergreen, CGM, and ONE) clarified that they will utilise digital technology to satisfy customer needs. In particular, Evergreen and HMM state that the implementation of CC will meet the expectations of the clients, while CMA CGM and ONE clarify that the advantages of digitisation, such as real-time freight estimation and container tracking, will address the needs. Consequently, it can be said that shipping businesses employ digitalisation to lower costs and increase their competitiveness by understanding client needs.

Ebhote and Nkebem (2019) The aspects of service quality that affect consumer experience in the shipping sector are identified in this study. The Ports Authority-One Port in Port Harcourt, Rivers state, served as study's population, and a survey research design was used. At Onne Port, 143 responders were selected using a purposive sample strategy. Utilising the characteristics of service reliability, service responsiveness, empathy, assurance of best practices, and tangibility in the shipping business, results showed a substantial relationship between customer gratification and service quality. The study suggested that to increase customer satisfaction, the Ports Authority's management should focus on service quality and other performance metrics that could result in it. They should also strengthen their knowledge of service quality and conduct regular, ongoing, and consistent evaluations of efficient service quality across their operations. Finally, since it is impossible to deliver what you do not have, the Port Authority's staff and workers should

be evaluated internally on the aspects of service quality to promote and enhance competence.

Riitho (2018) The containerised shipping business, which is the foundation of world economy, is categorised as a service sector because trade drives its demand. Cost-cutting measures and international partnerships are no longer sufficient to guarantee container carriers' earnings will last due to global financial trends. The secret to a long-term competitive edge and profitability growth is the capacity of container carriers to ascertain the needs of their clients and provide high-quality services that surpass their expectations. This study examined how customer satisfaction in container shipping lines is impacted by service quality. The Revenue Authority issued a list of licensed customs agents, from which 273 respondents were chosen at random to provide data. Using a structured questionnaire, the study gathered primary data, which was then subjected to correlational, descriptive, and inferential analysis. The association between customer satisfaction and service quality was investigated using Spearman's rank correlation, and the difference between the importance and perception of service quality was evaluated using Wilcoxon's rank test. The main conclusion was that measures to increase customer satisfaction should give priority to the "responsiveness" component of service quality, which is made up of supporting pointers that evaluate customers' perceptions and experiences both before and after a transportation service occurs. Results also showed a substantial correlation between customer satisfaction and the four aspects of service quality: value, speed, responsiveness, and reliability. This study's main contribution is that it testified to the validity of SERVQUAL-developed service quality sizes for the container shipping sector empirically.

Turan et al. (2022) One of the industries with the highest rates of work-family disputes is maritime. Examining the outcomes of behavioural outputs is crucial in a setting

where avoiding family members is so successful that burnout is accompanied by significant challenges. The study's main goal is to investigate how burnout affects job satisfaction in "work-family conflicts" (WFC) that important participants in the marine sector encounter. SEM, or structural equation modelling, was utilized to analyse data collected from 372 participants who were employed in the maritime industry. The findings indicate that job satisfaction is somewhat mediated by burnout. The literature study and findings are followed by a conversation about the applications that inspire and maintain the interest of important stakeholders. Conflict between work and family has been demonstrated to be a significant factor in burnout and job satisfaction modelling for people employed in the maritime sector.

Yorulmaz and Taş (2022) Liner shipping has been a dominant force in the worldwide cargo transportation business for more than 60 years and is seeing rapid expansion. This type of transportation offers door-to-door service, uses container ships principally, and has pre-established ports of departure, arrival, and transfer. Thus, global competition must comprehend the connection between customer happiness, service quality, and behavioural purposes in liner shipping. Its mediation role in the liner shipping industry's causal relationship between customers' intentions to behave and the quality of key services, this study seeks to ascertain if customer satisfaction has an alternative effect. It accomplishes this by surveying forwarder companies operating in Turkey and analysing the data using the statistical package software SPSS v22 and AMOS v22. This study found that core service quality positively influences both customer satisfaction and behavioural intentions and that customer satisfaction mediates the association between core service quality and their intentions to behave. Customer satisfaction and core service quality are found to be significant constructs for future behavioural intentions. Business managers in liner shipping industry should, according to the study's findings, include essential services

that will improve consumer gratification in their marketing strategies and take part in managerial initiatives that do just that.

Sani and Febrian (2023) An overview of previous research studies from the viewpoint of a researcher is the goal of this scientific study. The discussion approach makes use of a graphic writing style. Before the data can be thoroughly examined and concluded, analysts get the information they need from other sources. Incremental data collection techniques will be used to gather information for the investigation. Books, research papers, lecture notes, articles, and the Internet are used to obtain more information. Relevant scientific publications were chosen, examined, and edited as part of the literature review. The variables discussed in the Results and Discussion offer responses that align with the purpose of this dissertation, which is to clarify through perspective, in addition to other aspects that can be used as research subjects, traits, and models for research outcomes. Proceed. The results of earlier marketing papers are related to consumer loyalty. The same is true for customer satisfaction; some international articles from ScienceDirect and Scopus publications show a wide range of interactions between variables. The fact that variables have never been examined in sea transportation service organisations makes this scientific endeavour unusual.

Amara and Negm (2022) Seaports are essential to the sustainability of tourist destinations' economies and environments in the modern world. Around the world, seaports and the facilities that go along with them, ranging in size and type, are vying for market share. To determine which important marketing mix strategy should be prioritised by seaport cities, this study aims to examine the effects of seaport marketing mix strategies on consumer gratification. This quantitative study develops a planned model with multiple hypotheses to be tested using a deductive approach. It is regarded as descriptive research since it aims to illustrate the traits of the community under study, provide relevant answers,

and clarify seaport marketing tactics and their effects on customer satisfaction. Convenience sampling is used to distribute online surveys between December 2021 and January 2022, which is a cross-sectional interval. The findings indicate that consumer satisfaction with the ports is positively and significantly impacted by seaport services, promotion, employees, tangible proof, and procedures. Price and seaport location/distribution have little bearing on customer satisfaction. This study is one of several continuing efforts to investigate seaport marketing to enhance a country's present tourism sector. To suggest a successful marketing plan, the emphasis is on seaport satisfaction and identifying the key marketing mix experiences. Thus, by demonstrating the importance of the marketing mix and how its components differ depending on the industry, this study contributes significantly to the marketing expertise of a growingly significant segment of the tourism industry.

Yuliantini et al. (2022) This study aims to analyse the connection between the quality of service provided by PT Buana Listya Tama's ship agency, effectiveness of their interpersonal communication, and level of satisfaction their users report. By administering a survey, this study employs a quantitative methodology, and correlation and regression analysis are used to examine the data. Ho was rejected while Ha was allowed because the findings demonstrated a positive correlation between the interpersonal communication variable and customer satisfaction, with a t-count value of 6.108 greater than the t-table of 1.998. The F test shows that satisfaction is correlated with both service quality and interpersonal communication at the same time. If the F count is higher than the F table (90.839 > 2.75), then Ho is rejected and Ha is accepted. Between variables, the coefficient of determination (R Sguare) is 0.749, or 74.9%. Customer satisfaction is 74.946% impacted by interpersonal communication and service quality, while 25.1% is influenced by other elements that were not looked at. 749, or 74.9%.

In Last few years, Shipping Industries have been more competitive. Each Liner needs to provide faster response & Accurate Information to Customer to gain the business. Here, Customer service has a very important role in giving correct information. The most important discovery is that four Service Quality parameters can parsimoniously represent Reliability, Service Quality in liner shipping. responsiveness, speed, and value are listed in decreasing order of their impact on customer satisfaction. Customer satisfaction is mostly predicted by speed and reliability. (Yuen and Thai, 2015).

The customer gap delineates the disparity between what customers anticipate and what they perceive. Customer expectations encompass the envisioned level of performance upon entering a service agreement (Zeithaml, Bitner, & Gremler, 2009). Hence, they encapsulate customers' beliefs regarding anticipated outcomes. The primary challenge faced by customers often revolves around service quality, which can be bolstered through the integration of new shipping technologies.

In contrast, customer perceptions represent the subjective appraisal of the service's actual performance. In simpler terms, they reflect customer satisfaction post-service delivery (Tonchia, 2008).

The gaps model of service quality

The model, which has five gaps, is shown in Figure. The gaps consist of a customer gap, four gaps in provider listening, service and standards, performance, and communication, and a customer gap in overall support. Each of these gaps needs to be filled in order to provide a service that meets the expectations of the clients.

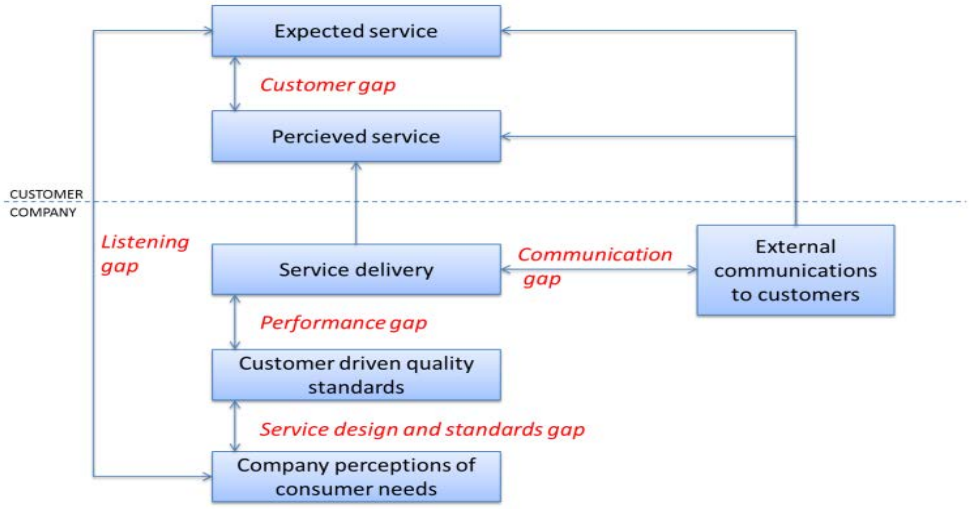

Figure 2.3: The gaps model of service quality

Source: *- (Othelius and Wemmert, 2013)*

Service Quality

Delivering services that clients perceive as high quality is the main goal of any service organisation. Service quality, therefore, hinges on customer perceptions of how effectively the service provider meets their expectations. Throughout the service delivery process, every step aims to generate value for the customer, necessitating a focus on meeting customer expectations to ensure satisfaction. Ultimately, a service provider's success in delivering quality service is gauged by overall customer satisfaction at various touchpoints during service journey (Hu, Kandampully and Juwaheer, 2009).

Exceptional service quality yields increased apparent value and satisfaction for customers, enhancing perceptions of the service company's corporate image and fostering customer loyalty and repurchase intentions (Hu, Kandampully and Juwaheer, 2009). Consequently, service providers must continually strive to enhance and monitor service quality throughout the entire service process to ensure alignment with customer expectations (Hu, Kandampully and Juwaheer, 2009).

Customer Needs

Simply offering a service that excels in certain areas compared to competitors isn't sufficient; those areas must also hold significance and generate value for customers to establish a meaningful competitive advantage. Therefore, understanding which aspects of a service are important to customers is paramount for the service provider (Gould, 2012) .

In the maritime industry, meeting customer needs effectively is crucial for shipping companies, and these needs encompass various essential aspects. Customers prioritize speed, seeking fast movement of cargo and vessels to ensure timely deliveries. Additionally, Security is paramount, requiring measures to always ensure the safety of cargo and personnel, including crisis management skills. Compliance with marine laws and regulations is expected, necessitating knowledge of onboard contents and strict adherence to regulations. Responsiveness is key as customers become more demanding.

2.3 The state of robotic process automation at the moment

The concept of a real robot performing human-like operations is known as RPA. Automated processes are software settings that aim to do different kinds of work normally done by humans. RPA is defined as a technique, system, and set of tools by Lacity and Willcocks, (2016) and Bataller, Jacquot and Torres, (2017) It includes computer programs stored in computer systems and is intended to automate manual activities. They believed that Customer service with faster response with accurate information is achieved with Robotic process automation. This will lead to eliminating the repetitive work performed by Humans, allowing them to work more productively.

Sullivan, Simpson and Li (2021) discovered that White-collar employment could be at risk of being offshored due to the increasing affordability and ease of use of workflow automation. When deciding whether or not to use RPA, you should determine how many tasks you have that are repetitive, do not require physical input from humans, have minimal

subjectivity requirements, and are large in comparison to the number of tasks performed by your internal team. Konica Minolta has 55 automated bots up and running as of 2018, with another 50 or so in various stages of development. There was an opportunity to save about 1900 hours in 2018, and they anticipate saving 33,000 hours in FY 2019. Instead of trying to replace RPA with human workers, the focus here was on providing greater value to their clients' businesses. When it comes to areas where logistics service providers just do not have the financial leeway to throw additional employees at the problem, client expectations are on the rise. The utilisation of software robots in process automation is a relatively new development known as RPA. RPA offers a great chance for the company to boost performance, productivity, efficiency, cost-effectiveness, reaction time, and customer loyalty. As per IEEE (IEEE Xplore Full-Text PDF:), approximately 20% improvement potential exists for 80% of Organization Process. The remaining 80% of Processes can’t be fully by using technologies like ERP Systems. It’s necessary to employ low-cost improvement techniques using software-based applications or RPA.

There are many studies in different industries Logistics, Healthcare these all research shows how to implement the RPA Solution in these industries along with customer service satisfaction but there was no research explained about Shipping industries or Liner business and how the RPA & Cognitive computing will improve the customer service with their existing system at reasonable cost.

2.4 What is RPA?

RPA stands as a software-driven solution facilitating the construction, deployment, and supervision of digital robots. These automated entities emulate human behavior in their interactions with software and digital environments. Offering a superior alternative to human involvement, these robots execute tasks with unwavering consistency and heightened speed. Notably, they contribute to time-saving and enhanced productivity by

operating without the need for breaks. Their capabilities encompass various human-like functions such as accurate keystroke execution, screen comprehension, data identification and extraction, system navigation, and a broad spectrum of predefined actions. Embraced by businesses for its seamless integration and non-disruptive nature, RPA optimizes workflow efficiency. This technology not only proves profitable but also delivers numerous benefits to employees, amplifying their productivity, engagement, and motivation by relieving them of mundane tasks.

RPA has the potential to assist many different groups. As a whole, it simplifies operations, which in turn reduces waste and boosts the economy. Among the many fields that reap the rewards are:

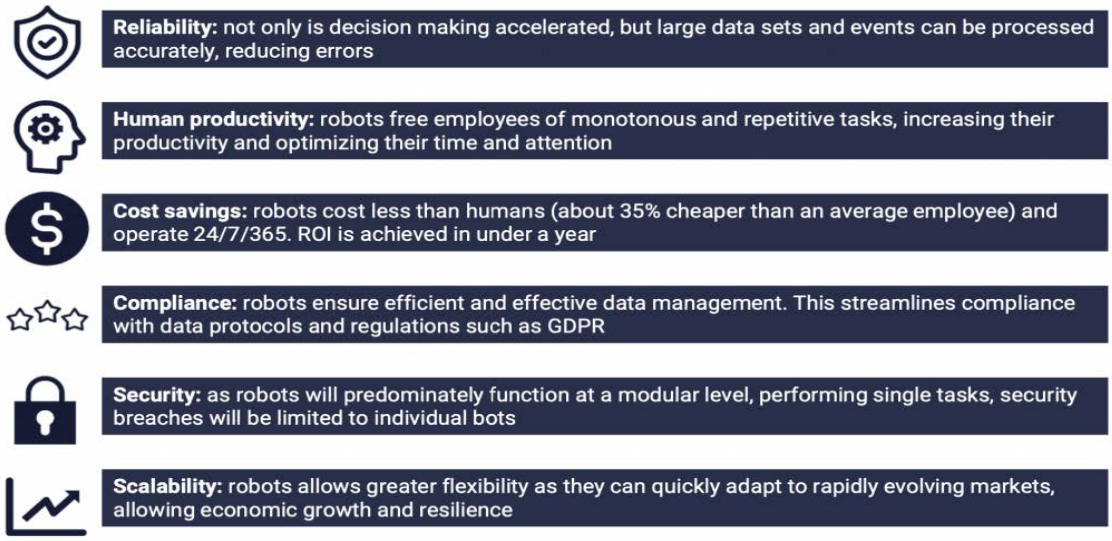

Figure 2.4: Robotic Process Automation (RPA)

Source: *- (Vyas, 2024)*

However, In the healthcare sector, widespread adoption of RPA remains limited. This is attributed to a complex mix of factors, such as logistical challenges, initial investment expenses, and reluctance stemming from previous failed trial implementations rushed into operation. Nonetheless, there exists substantial potential for RPA to expand

within the healthcare industry. This expansion stands to enhance patient experiences by bolstering access to and the quality of care provided, while also empowering healthcare professionals by freeing up their time and resources from ordinary tasks, allowing them to focus on more serious responsibilities. Furthermore, the integration of RPA holds the promise of optimizing operational costs within healthcare services, thereby redirecting funds to areas of greater need.

Although not comprehensive, the following highlights primary RPA use cases in the healthcare & logistics sector where opportunities for enhanced automation and efficiency are evident. Consequently, directing solutions towards these areas may prove beneficial.

RPA Benefit & Challenges after implementation in Logistic & Health care

After the implementation of RPA in different departments or Processes of Logistic, find below the benefits identified (Integratz, 2023).

- **Smart Documentation:** RPA streamlines and quickens the documentation process and its outcomes. In addition, compared to a human, a robot is less likely to make a mistake when documenting the process. In the supply chain process, accurate data collecting and documentation are of the utmost importance to any logistics organization. RPA can record data via electronic data exchange, credit collection, processing of invoices, and automatic storage of information in audit trails.
- **Order Processing:** The focus of (RPA in logistics order processing is the manner in which current and historical data interact with one another. Information regarding client profiles, order placement, order update control, and payment processing is automatically recorded and entered by this system.

- **Shipment Tracking:** Logistics providers rely on shipment tracking as a critical feature. RPA enables businesses to monitor the whereabouts of both the cargo or container and the vehicle transporting it. The organisation is able to track shipments and notify clients as needed with this method. In addition, they can retrieve shipment details if needed.
- **Shipment Status Communication:** Improving customer service is one of the main uses of RPA in logistics. The clients are the ones who really stand to gain from the shipping status communication procedure. It lets consumers track the progress of their package and provides regular updates. They will be able to see when their package will be ready for pickup and where it is at all times. In addition, your customers will be notified of any delays through automated emails and messages generated by this system. When a customer verifies an order, this automation is activated as well.
- **Customer satisfaction is a key component of any successful logistics company.** Consequently, you must establish a system that properly and efficiently meets the demands of every one of your clients.

RPA Customer Service Improvement in Logistics

Leveraging RPA within customer service operations not only yields benefits for the logistics company but also substantially enhances the customer experience. Below are several instances of RPA implementation in customer service and associated advantages (Integratz, 2023).

- **Improves Face-to-Face Interaction:** A primary challenge for logistics companies is effectively meeting the diverse demands of their customers, which can be both varied and difficult to manage. Introducing RPA into operations allows the delegation of ordinary and repetitive tasks to robots, thereby freeing up employees

to focus on delivering superior customer service. With routine tasks automated, skilled labour can allocate their time to more critical responsibilities, such as directly engaging with customers and addressing their concerns. This approach is instrumental in significantly enhancing client satisfaction levels.

- **Immediate Responses:** Efficient communication between customers and service providers via email is vital for a seamless experience. RPA enables automated email notifications for order processing, shipping updates, or delays, ensuring proactive communication and maintaining high levels of customer satisfaction. Customers can get trustworthy answers to their questions and problems quickly thanks to addition of RPA with automated chatbots by company's system. This system enhances operational efficiency, enabling streamlined management of day-to-day operations and customer services. Clients no longer endure lengthy wait times to connect with representatives for simple questions. Moreover, this approach can substantially boost profit margins across the board. Efficient handling of customer concerns expedites shipment processing for shippers and forwarders, thereby maximizing sales conversion rates. The rapid response to client queries and concerns becomes pivotal in optimizing overall profitability.
- **Customer Identification:** Utilizing RPA streamlines the process of identifying customers through a unified customer view, presenting significant advantages for your logistics company on multiple fronts. Primarily, it optimizes time usage, thus enhancing overall productivity. Additionally, it enables customer service representatives to swiftly access customer data, expediting service delivery and minimizing customer wait times. The rapid and accurate service provision contributes to heightened customer satisfaction. Moreover, leveraging advanced data analytics facilitates the discernment of specific customer requirements,

fostering a deeper understanding of their needs and enabling tailored service provision. Ultimately, this approach cultivates stronger bonds between your company and its clients

- **Invoice Processing and Credit Collections:** One of the foremost challenges in the industry is timely payment collection after services are rendered. RPA addresses this by integrating multiple systems to streamline the process. By automating invoice processing and linking with freight bill payment systems, RPA facilitates seamless order-to-cash processing for numerous large 3PL carriers.
- **Automating Order Processing & Payments:** Manual entry of customer information, processing payments, sending confirmation emails, and placing orders can be labor-intensive. RPA automates these processes, improving efficiency and reducing errors in order processing and payment procedures.
- **Speed Invoicing by Integrating Systems with Customer Portals:** RPA eliminates manual data entry and attachment processes by seamlessly integrating systems with customer portals. By automatically extracting shipping data, attaching scanned PODs and invoices, and updating customer portals, RPA accelerates the invoicing process from days to seconds.

RPA Customer Service Improvement in Health care

Automating processes in medicine offers a multitude of advantages, including enhancements in efficiency, productivity, and cost-effectiveness (Chen, Chang and Lai, 2009). However, it's imperative to acknowledge that the qualitative aspect of RPA in medicine should not be overlooked, as Peter B. Nichol emphasizes that the discourse has expanded beyond mere cost reduction to involvement, encompassing performance, and inventiveness (Rosen, 2023) .

To begin, the HFS Architecture Study's findings support the feasibility of automating structured data using preset model parameters. According to KPMG's research, RPA has a lot of potential in the healthcare industry, particularly in the areas of billing and administrative chores, such as patient account management (from preregistration to bill payment). Since mistakes in data entry can have significant financial consequences, revenue cycle tasks that are well-suited for automation include patient pre-arrival, medical professional discussion applications, and presence checking, and claim denials.

RPA offers error-free assistance in various tasks involving implementation, patient records, insurance adjudication, management, and patient information, thereby eliminating the expenses associated with re-processing and reducing overall healthcare spending. Additionally, practitioners, process automation can help members, and hospital administrators by allowing bots to handle tasks that are both time-consuming and prone to errors. These tasks include care collaboration services, practitioner accreditation, and registration accounting.

UiPath presents a notable case study from a Berlin hospital with nearly 2,000 staff and a substantial number of annual emergency and outpatient visits. The hospital adopted RPA software to improve control over operations, leading to increased patient satisfaction through more efficient supply operations and reduced costs per claim. Delegating mundane tasks to intelligent automation allows hospital personnel to focus on acute management, and healthcare administration, benefiting patients, and the organization as a whole.

It's crucial to recognize that RPA should not be perceived as a difficult rival threatening job security. Instead, it facilitates an effective division of labour, allowing humans to focus on tasks that need uniquely human capacities, such as creativity and critical thinking, while machines handle mundane administrative work. This perspective is

especially evident in medicine, where mechanization serves as a facilitator rather than a replacement for manpower.

In ongoing exploration of cutting-edge artificial intelligence technologies, the study aims to delve deeper into RPA, often considered the lesser-known counterpart of AI chat tools. RPA incorporates software to automate data processing and system integration processes as well as repetitive tasks based on rules. Its implementation can significantly enhance efficiency, ensure quality cut costs, and compliance, and ultimately bolster patient outcomes and satisfaction within healthcare organizations.

Furthermore, by integrating RPA with artificial intelligence, healthcare entities can develop intelligent automation solutions capable of tackling intricate and unstructured datasets. These technologies take advantage of cognitive talents like “optical character recognition” (OCR) and natural language processing to manage increasingly complicated jobs. Healthcare organizations may greatly boost their automation capabilities through the utilization of computer vision, ML, and natural language generation. This will lead to better patient care and operational efficiency.

RPA may give numerous advantages to healthcare providers, payers, and patients, including:

- **Streamlined administrative processes:** RPA can automate various administrative processes like patient scheduling, reporting, claims processing, billing, and data entry, thereby minimizing errors, saving time, and allowing staff to focus on higher-value tasks. As an illustration, RPA can facilitate patients in scheduling appointments online autonomously and dispatch automated reminders to decrease instances of missed appointments.
- **Improved clinical documentation:** By automating the extraction of data from many sources, such as electronic health records and speech recognition systems,

RPA helps clinicians efficiently document patient interactions, diagnoses, treatments, and results. In addition, RPA helps with billing and coding by applying modifiers and codes correctly based on clinical evidence. Through this integration, revenue cycle management, accuracy, and compliance are all improved.

- **Elevated patient care:** The relevance of the patient, the end user, is paramount throughout. Because it simplifies treatment coordination, case management, and remote patient monitoring, RPA is an essential tool for bolstering patient care. Assisting with patient progress monitoring, alerting and notifying, providing personalized recommendations, and facilitating communication between providers and patients. In addition, RPA uses data from several sources to see which patients are at high risk and need preventative measures.

Impact of RPA on Logistics

Various technical solutions form the basis of the organization's modern and innovative logistical processes. We may now speak about a major dynamization of digitization in its broadest sense. This is due to some factors; for example, COVID-19 pandemic, economic globalization, and the increase of Industry 4.0 are all relevant examples.

Because of this, it's safe to assume that AI, robotization, and automation will gradually supplant human workers in many industries in the not-too-distant future. (Boyes, (2015); Sherman and Chauhan, (2016); Bock, Iansiti and Lakhani, (2017); Ocicka, (2017); Nahavandi, (2019); Salimova et *al.*, (2019); Aslam *et al.*, (2020); Longo, Padovano and Umbrello, (2020); Frederico, (2021) ; Vogt, (2021)).

Logistics is one area that is seeing a rise in the usage of automation. The expense-benefit analysis of robot ownership has undergone a sea change in the last several years. Within this framework, organisations can greatly benefit from implementing

RPA technology. The foundation of it is the employment of computer programs (robots) to automate repetitive commercial activities.

A business process is a defined series of steps that, when performed in a certain order, are measurable, rule-based, and intended to produce a desired outcome. Conversely, a robot is software that mimics human actions in the background or at the user interface level to automate specific tasks that are part of a business process. The efficiency and merits of using robot can be evaluated from many angles. Individual projects should have their own set of evaluation standards. (Aguirre and Rodriguez, (2017); Anagnoste, (2013); Kedziora and Kiviranta, (2018); Rajesh, Ramesh, and Rao 2018).

RPA is the use of software robots that can execute rule-based tasks within business processes in a way that is similar to how humans do them (Cernat, Jakubiak and Preillon, 2020; Willcocks, Lacity and Craig, 2015). RPA is unique among automation methods in that it functions on the application's front end (Lacity and Willcocks, 2016b). Because it involves both digital and physical operations, logistics is a good candidate for RPA integration. Implementing RPA in logistics offers numerous advantages. Firstly, automation allows workers to concentrate on higher-value activities, which in turn reduces workforce spending and ultimately saves money (Murdoch, Liu and Yu, 2018). Second, businesses can benefit from a ROI that is both quick and easy to forecast (ROI). Improved compliance as a result of transparent log data, faster process execution, bot availability 24/7, and increased process accuracy are further advantages (Murdoch, Liu and Yu, 2018). It also requires less work to implement than other, more intrusive forms of automation as it necessitates neither intricate adjustments to application systems nor extensive coding expertise, thanks to reusable programmed modules (Auth, Czarnecki and Bensberg, (2019); Lacity and Willcocks, (2016); Langmann and Turi, (2020)). However, the primary challenge lies in establishing a comprehensive framework for RPA implementation.

Logistics, with its numerous sequences of repetitive processes, offers ample opportunities for optimizing through Robotic Process Automation (RPA). RPA isn't just about enhancing individual processes; it extends to delivering significant business impacts at scale.

- **Enhancing Efficiency and Minimizing Errors:** Research indicates that RPA can reduce labor-intensive tasks by up to 80%. Whether it's load capturing, stock monitoring, or reporting, RPA accelerates processes, leading to increased speed and accuracy in data processing, with bots achieving near-perfect accuracy.
- **Cost Reduction and Operational Efficiency:** By automating tasks, operational costs can be significantly decreased, freeing up financial resources. With tasks handled faster, existing staff can be redirected to other responsibilities, eliminating the need for additional hires.
- **Boosting Staff Retention and Satisfaction:** RPA liberates employees to channel their energies towards decision-making, innovation, negotiations, and business expansion, fostering a sense of accomplishment and driving growth within the organization.
- **Enhancing Customer Service:** The speed and efficiency achieved through RPA enable faster processing of customer orders, resulting in increased order volumes and quicker delivery times. Additionally, customers appreciate the improvements in service resulting from the reduction in manual labour, further enhancing satisfaction levels.

Challenges assumed after implementing the RPA

According to the Forbes article, there are some challenges assumed:

Despite the possible advantages of RPA, there are notable trials that must be addressed before integrating this technology into health care settings. While some of these

challenges may be familiar due to past experiences with emerging AI tools, it is crucial to remain mindful of these considerations. These hurdles include:

- **Safeguarding data security and privacy:** Health care statistics is extremely sensitive and regulated by stringent laws like HIPAA and GDPR. RPA solutions must ensure data encryption, anonymization, secure storage, and restricted access for authorized personnel. Additionally, compliance with audit trails and reporting standards is essential to uphold accountability and transparency.
- **Addressing integration and interoperability issues:** Health care structures often comprise a complex network of applications and platforms that may lack compatibility or standardization. RPA solutions need to seamlessly integrate with existing systems and processes, avoiding disruptions to workflows and preserving data integrity. Moreover, they should adeptly handle diverse data formats and sources, including both structured and unstructured data.
- **Navigating digital transformation and governance:** Transforming healthcare utilizing RPA needs a change in mindset and clear goals. The planning, design, testing, deployment, and monitoring phases must involve stakeholders from all levels and departments of the organisation. The key to long-term success in RPA management is defining who is responsible for what in terms of ownership, upkeep, updates, performance assessment, and risk reduction.

While still in its nascent stages, emerging technologies like RPA offer valuable lessons from early implementations. Organizations must grasp several key principles:

- RPA adoption entails more than just acquiring the technology; it necessitates a comprehensive approach to business transformation.

- Competencies should be developed gradually, recognizing that RPA implementation is a transformative process requiring careful facilitation and management.
- Starting with small-scale pilot projects enables organizations to gauge internal processes, identify areas of friction, and assess the potential for RPA integration.
- Early engagement and empowerment of all relevant stakeholders are crucial for a successful transition.
- Collaboration with legal teams at the outset is essential to anticipate and address any regulatory hurdles.

2.5 Comparative analysis on Robotic Process Automation in different Industries

Despite the general impression that robots are performing human-like duties, RPA is a software solution. For RPA purposes, a robot is synonymous with an application. RPA, as it pertains to corporate operations, is technical mimicry of a human worker. RPA aims to efficiently and effectively handle organized and repetitive tasks, which are prevalent in ERP systems or productivity tools (Fung, (2013); Slaby, (2012), Willcocks and Lacity, (2016)). Some have speculated that RPA's ultimate goal is the external-facing automation of human jobs. This is different from the traditional "inside out" method of optimising IT infrastructure. (Kommera, 2019).

Since RPA is not a component of an administration's IT infrastructure but rather sits on top of it, “The Institute for Robotic Process Automation and Artificial Intelligence” (IRPA-AI) states that adopting it suggests a minimal level of intrusiveness. (Casale, 2015).

According to Capgemini Hofmann, Samp and Urbach, (2020), the cost of an RPA software license might be anywhere from one-third to one-fifth of what a full-time human would cost. Furthermore, according to Lacity and Willcocks, (2016), a robot is capable of

performing organised tasks that two or five humans could complete. In any case, the following benefits come from businesses using RPA (Willcocks and Lacity, 2016):

- Since RPA is simple to set up, developers don't require programming knowledge.
- RPA software doesn't require the replacement, creation, or development of costly platforms because it is built on pre-existing systems.
- RPA is a safe platform that is made to satisfy the company's IT needs in terms of auditability, scalability, security, and change management.

Since a wide range of studies that are available in the literature, including Aguirreand and Rodriguez, (2017); Anywhere, (2019); Buckingham and Goodall, (2015); Bygstad, (2017); Hultin and Josefsson, (2017); Hultin *et al.*, (2017); Egiyi and Chukwuani, (2021); Lacity *et al.,* (2016); Lamberton, Brigo and Hoy, (2017); Le Clair, Cullen and King, (2017); Mijović *et al.*, (2014); Naik, Garbacki and Mohindra, (2006); Varghese and T. A., (2017); Willcocks, Lacity and Craig, (2015); Willcocks, Lacity and Craig, (2017), It is evident that businesses in a variety of settings are starting to integrate RPA software into their operations to: (1) take advantage of the benefits that RPA offers to cut costs; and (2) increase productivity.

Some business procedures are not appropriate for their utilisation, despite the significant benefits in terms of savings Asatiani and Penttinen, (2016), Fung, (2013) states that RPA is most effective for low-knowledge, routine business process tasks that query several systems and apps, as well as standardized procedures with minimal control exceptions and a high potential for human error. Companies that depend on back-office tasks are the best fit for RPA because of these reasons. (Geyer-Klingeberg *et al.*, 2018; Penttinen, Kasslin and Asatiani, 2018).

According to the Intelligent Automation Industry 2022 Survey Report, compiled from insights provided by over 400 leaders in intelligent automation, RPA, and Digital

Transformation across various sectors, there is a growing expectation from customers, employees, and investors for businesses to demonstrate agility in delivering new services and capabilities aligned with market demands. The survey indicates that companies are maintaining momentum in their investments in RPA, Intelligent Automation, and Cognitive Computing.

Although just 30% of defendants were actively investing in IA and RPA in 2021, 42% of respondents stated they were already investing in RPA, and 64% of respondents stated they had already capitalized in intelligent automation. In 2023, 54% of respondents stated they intended to invest in RPA, while another 35% stated they intended to implement intelligent automation.

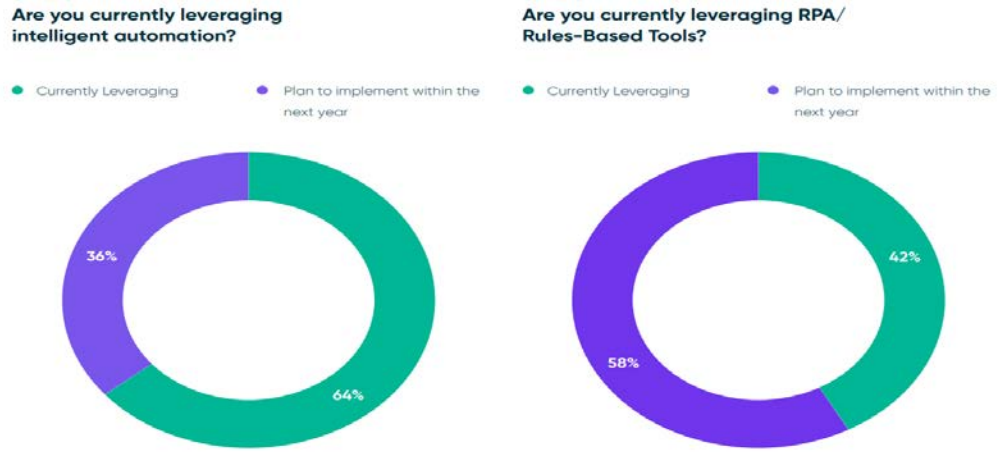

Figure 2.5: Comparative analysis on Robotic Process Automation in different Industries

Source: - *(Mixson, 2022)*

Digital Transformation analysis done in year 2022, there was 46% investing in the Digital Transformation whereas it was increased to 84% in Year 2023. RPA played major role to increased number of Digital Transformation. Most of industries Organization are ready to increase the budget by 40-49% as per 2023 survey.

Questions	**Increase**	**Decrease**	**Same**	**Don't know**

Do you expect your budget for intelligent automation to increase over the next year?	49%	23%	23%	5%
Do you expect your budget for RPA/Rules-Based Tools to increase over the next year?	40%	28%	24%	5%

Source: - *(Intelligent and Network, 2023)*

2.6 Business models in RPA

Market specialists predict that RPA will continue to expand, with a wide range of potential outcomes under consideration for its future. The current state of the economy favours RPA adoption, and as machine learning and artificial intelligence technologies advance quickly, it is predicted to play an important role in organizations. RPA, a data-driven automation approach, streamlines repetitive tasks, minimizes error, and reduces paperwork across large enterprises (Leshob, Bédard and Mili, 2020).

Several studies suggest that the automation sector will increasingly adopt RPA models with built-in features for process automation, leading to significant reductions in labour force and paperwork. Future developments in RPA are expected to include its broader integration with other technologies, such as artificial intelligence (AI), resulting in more efficient data rekeying, input, and analysis tasks. Therefore, fewer employees will be needed for business operations, with RPA technologies assuming their roles.

Anticipated future developments in RPA include:

1. **Increased utilization within businesses:** RPA will be applied across more processes within enterprises, leading to significant efficiency improvements, such as in sorting incoming emails.

2. **Integration with other technologies:** RPA will be increasingly combined with other automation technologies to optimize results, reflecting the understanding that automation tools work best when interconnected with other tools.
3. **Combination of AI and RPA:** RPA and AI technologies will have far-reaching effects across various sectors, potentially impacting the job market. Predictions vary widely, with some experts foreseeing job displacement due to automation, while others believe technology will create more jobs than it eliminates.
4. **Low-cost RPA solutions:** The commercialization of RPA has accelerated, with more organizations offering competitive RPA systems at lower costs, particularly with the rise of open-source solutions.
5. **Replacement of paperwork by robots:** RPA will increasingly automate mundane and time-consuming tasks traditionally handled by humans, leading to more efficient utilization of human labor and widespread adoption of pre-built RPA models by 2025.

Popularity of the Robotic Process Automation

Software automation technology called RPA (robotic process automation) can be programmed by users to carry out business operations. It lets users build clever software bots that do a variety of jobs around the office, such as filling out forms and uploading data to data analytics tools, freeing up human employees to work on more important projects. The advantages are numerous:

- RPA solutions assist call centres by providing service agents with sales advice.
- RPA solutions help with data entry in the healthcare industry.
- By disseminating data between departments without the need for human assistance, RPA benefits the banking industry.
- RPA is also involved in the maritime sector.

So, focusing on shipping perspective I learned that RPA has gained considerable traction within the shipping industry due to several key reasons.

Firstly, RPA greatly enhances operational efficacy by automating repetitive and rule-based tasks like finance processing, data entry, operation, documentation, and invoice management. In addition to decreasing errors, this automation frees up human resources to work on more planned projects. Secondly, there is a significant cost reduction associated with implementing RPA. By systematizing routine tasks, shipping businesses can reduce operational costs related to manual labor, leading to improved financial performance. Moreover, RPA systems ensure enhanced accuracy and consistency in tasks, which is crucial in an industry like shipping where precision and compliance are paramount. These systems also play a vital role in ensuring compliance with regulations by automating compliance checks and documentation processes.

Additionally, RPA solutions offer scalability, enabling companies to handle fluctuations in shipping volumes and business growth without requiring substantial infrastructure changes or additional resources. Furthermore, RPA leads to faster processing times for critical tasks such as customs documentation, billing, and cargo tracking, resulting in quicker turnaround times and higher customer satisfaction levels.

Lastly, RPA's integration capabilities allow seamless integration with existing IT systems and applications used in the shipping industry, facilitating smooth interoperability and data exchange across various platforms.

Automation of Robotic Processes and Business Process Management

Emerging technologies have upended markets, company models, and corporate processes within the last ten years (YUNUS and AMAN, AINI & KELIWON, 2019). According to Anagnoste (2017) now and then, a technology appears that challenges the way things are often done in a business. People working alongside robots is predicted to

drastically alter the workplace in the future. Particularly when the Alpha and Z Generations, who have never known life without the Internet, start working. To draw in, keep, and involve them, a new approach will be required (Anagnoste, 2018). Nearly every employment will undergo restructuring in the same way. As a result, businesses must think about how they operate, plan for future expansion, and manage their work. Such work redesign will result in newly designed employment. (Fernandez and Aman, 2018; Willcocks, 2020).

The ever-changing environment and increasingly knowledgeable users present numerous obstacles to organizational process management. At the same time, every technology offers a chance for an organization to innovate (Šimek and Šperka, 2019). According to Uskenbayeva *et al.* (2019) the technologies are intended to provide an exceptional level of efficiency and customer service quality by optimizing management processes and developing organizations. This is related to PM because the RPA solution attempts to optimize processes and increase organizational performance (Fernandez and Aman, 2018; Šimek and Šperka, 2019). Business process management, the main focus of process improvement, has changed and been impacted by technology. It has moved from a more radical form, such as business process reengineering, to a more supple and incessant state (Šimek and Šperka, 2019). As a multifaceted strategy, business process management seeks to improve business performance through ongoing process optimization, digital transformation, and improvement (Ivančić, Suša Vugec and Bosilj Vukšić, 2019). In contrast, IT is viewed as a vital facilitator of process improvement, managing user-process interactions and emphasizing business process automation. Technology is a prerequisite for business process transformation for them to become more effective, flexible, compliant, enhance user experiences, or produce better results overall (Dey and Das, 2019; Kirchmer,

Franz and Bathmaker, 2019). RPA is an IT technology that is used in business process automation, one of the major themes in digital transformation (Sobczak, 2019).

As previously mentioned, it is crucial to look at the divergences, parallels, and synergies between RPA and connected technologies. Consequently, as RPA and BPM are complementary fields, BPM research public ought to investigate "business process management systems" (BPMSs) and RPA integration. (Mendling *et al.*, 2018)

BPM aims to improve business performance through digital transformation, optimization, and ongoing process improvement. BPMS, a comprehensive software platform with a range of functions like process design, analytics, and monitoring, is often considered a crucial perspective for BPM initiatives (Bosilj Vuksic, Brkic and Tomicic-Pupek, 2018). However, RPA handles discrete, repeated tasks and acts as a human would when carrying out processes. According to Cewe, Koch and Mertens (2018) Whereas RPA handles repetitive job sequences that can be entirely delegated to software robots, BPMS orchestrates end-to-end processes and manages connections between robots, humans, and systems.

Although these technologies are frequently used independently, the writers of business practice Forrester (2014); and Barnett (2015) strongly suggest combining the two to boost the worth of your company. When there is not enough time or resources to fully implement BPMS, RPA might be a cost-effective and efficient way to meet or augment some of the unmet goals.

2.7 Risks of the RPA Business Model Implementation

Integrating RPA within the shipping sector promises significant advantages like improved efficiency, cost reduction, and enhanced accuracy. However, navigating through its implementation comes with notable hurdles and potential pitfalls that demand careful consideration (Al Zarooni and El Khatib, 2023).

- One major challenge lies in the complexity of integrating RPA tools with current systems and workflows in shipping. The industry's reliance on legacy systems, diverse data formats, and multiple communication protocols can complicate seamless integration efforts.
- Ensuring data security is paramount, especially when dealing with sensitive information such as financial records, customer data, and cargo specifics. Implementing RPA without robust security measures may expose vulnerabilities, leading to data breaches or non-compliance issues with regulations.
- Shipping operations often exhibit process variability, requiring RPA solutions to adapt flexibly. Failure to customize bots appropriately may result in errors or inefficiencies, impacting overall operational effectiveness.
- Compliance with industry regulations and standards is non-negotiable, considering the sector's stringent safety, security, and environmental protocols. RPA implementation must align with these regulations across different regions, adding complexity to the deployment process.
- The reliance on stable IT infrastructure for RPA operations introduces risks related to downtime and operational disruptions. This necessitates robust IT support and contingency plans to maintain uninterrupted workflow continuity.
- Managing organizational change is crucial, as resistance to RPA adoption, lack of training, and job displacement fears can impede successful implementation. Companies need robust change management strategies to address these concerns effectively.
- Dependence on RPA vendors for updates, support, and maintenance requires careful vendor selection to mitigate risks of service disruptions or vendor lock-in situations.

- Scalability and performance of RPA solutions must align with fluctuating shipping demands to maintain operational efficiency under varying workloads.
- Identifying suitable processes for automation, optimizing them effectively, and considering ethical implications such as workforce impact are critical aspects that require meticulous planning and ongoing monitoring throughout the RPA journey.

According to Dr. Mathias Kirchmer, although all of this seems good, using RPA carries some risk, just as using any other automation technique. RPA is capable of completing routine jobs faster and with higher quality, but it is also more likely to make mistakes. An action is carried out without a human check. For instance, ordering incorrect items quickly and in large quantities can result from poor data quality or inadequate business rule specification. Alternatively, overlooked claim types may result in a large amount of rework in the claims processing, outweighing the advantages of automation. To achieve the anticipated performance benefits, RPA necessitates a thorough understanding of the business process in which it is employed.

Some Other Potential risks in the robotic process automation projects

RPA offers businesses quality enhancements and cost savings. These technologies' development has advanced dramatically in recent years, but there are still many obstacles due to a lack of knowledge about quality improvement, risk management, and savings (Morrison, 2019). Therefore, risks need to be taken into account and continuously controlled during software robot development, implementation, and subsequent use. According to Bedi, Goyal and Kumar (2020) industries today prioritise not just early risk detection but also prompt risk elimination. Morrison (2019) adds that the hierarchy of decision-making should always include information on risk management and choice to receive or discard RPA technology.

The period risk in business research has no widely recognized definition. The majority of the research, however, concurred on its three fundamental components: likelihood, future, and unfavorable consequence (Qasim, El Refae and Eletter, 2022). Only a small number of the examined literature's articles address the dangers of automating robotic processes. Most of these articles discuss RPA's characteristics, benefits, and drawbacks, as well as processes that can be automated or case studies that concentrate on a particular firm or industry. The research issue will be addressed in the ensuing parts, which will offer the findings of the study to close the discovered gap.

According to his research, Sobczak (2022) divided possible dangers related to the use of RPA into two categories: general risks and particular risks. The only risks that are specifically mentioned are those related to software robots created with robotic process automation. Traditional automation techniques, however, may potentially provide universal hazards. As per Sobczak, the following are the biggest risks associated with the robotic process automation project's
implementation:

- Employees' incorrect view of robotic process automation
- The incorrect method for implementing the RPA project,
- Using the incorrect tools for developing the software robot,
- Insufficient change management strategy for the automated procedures,
- Employee resistance to the processes that are supposed to be automated, and
- A decline in skills and understanding of the automated procedures.

One of the biggest dangers associated with robotic process automation is undoubtedly the technological component. It includes some difficulties. First of all, the vast majority of businesses that provide robotic process automation technologies exclusively provide Windows-based solutions—not MAC OS or Linux—for their clients

(Morrison, 2019). This constraint should be less of an issue in practice because practically all businesses utilize the Windows operating system. A drawback of software robots, on the other hand, is that they can only carry out repetitive activities based on clearly stated rules and are incapable of making sophisticated decisions Huang and Vasarhelyi, (2019), Robots cannot mimic the creative thinking of humans. (Maček, Murg and Čič, 2020).

As with any technology, robotic process automation comes with its fair share of security concerns and difficulties. A software robot may carry out its duties admirably for an extended duration before abruptly ceasing to do so. Human mistakes, coding issues, or system hacking are among the many potential causes of this problem. Modliński *et al.* (2022), state that robots could be taken out of service due to a lack of expertise and/or the expense of fixing their flaws, which would mean a waste of money spent on developing, testing, and implementing the robots. Data breaches and assaults are ever-present threats that necessitate round-the-clock surveillance to prevent mistakes and harm. Malicious software allows cybercriminals to access protected user data and robots without the owners' knowledge. It can be tough to discover security vulnerabilities when dealing with intelligent bots since they cannot recognize intent. (Baraković and Husić, 2022).

The human element is diminished or eliminated in corporate operations through robotic process automation (Morrison, 2019). However, existing research cannot support or refute a single opinion as it pertains to the possible reactions of employees to the automation of their employment (Ågnes, 2022). Workers are terrified that robots will one day replace them, according to LACUREZEANU, TIRON-TUDOR and BRESFELEAN (2020) even though there are many advantages. Employees are often content in their current roles, resistant to change, and worried about losing their employment (Fernandez and Aman, 2018). In addition, Modliński *et al.* (2022) mention that employees could be resistant to RPA since they are unaware of it and afraid of losing their jobs. The usage of

software robots will not, however, lead to layoffs of current staff. Bots will have a hard time taking over jobs that demand human intellect, such as negotiating, convincing, creative problem-solving, ideation, and pattern recognition (Yoon, 2020). Worker responsibilities that are amenable to automation should be reallocated to tasks that necessitate human interaction but are not amenable to automation.

CHAPTER III:

METHODOLOGY

3.1 Introduction

The nature of the study and its guiding concepts are described in this part along with the research technique. It distinguishes between quantitative and qualitative research designs, highlighting the use of qualitative methods for this descriptive study on the success or failure of businesses. The data collection process is detailed, starting with creating a screener survey for potential interviewees and developing probing questions for interviews.

Also, researchers have created a Google form (Internet Survey) with a questionnaire and shared it with Shipping business expertise, which will give Shipping business expertise flexibility to submit. For any questionnaires, the researcher was contacted personally to clarify the doubts. Interviewees were contacted through various channels, and those meeting the survey criteria were shortlisted. Each interviewee received an introduction to the research, followed by an email with the interview consent form and study details. Interviews were conducted over video conferencing and recorded for transcription and fact-checking. The researcher has used observation techniques to ask detailed, open-ended questions, aiming to answer the research questions through an abductive approach. In an interview, the interviewee is given a series of semi-structured questions in a predetermined order, and the researcher may probe further for more in-depth information. Participants were selected carefully from mid to senior roles, including Director or CEO, from businesses of varying sizes, revenue, and age to provide a comprehensive depiction of the challenges they faced.

Participants were informed of their rights and the interview permission form in order to maintain confidentiality. Following data collection, the researcher used an

abductive technique to analyses the interview and Google Form Survey data in order to pinpoint the crucial metrics and business procedures that determine success or failure.

These findings can be used to improve customer satisfaction using the Robotic Process Automation tool also, it will tell which area the Shipping process should be targeted by Shipping Lines to enhance their chances of increasing Productivity.

3.2 Overview of the Research Problem

Customer service is a key component in today's competitive global environment that determines a company's success. When compared to the consumer market, losing even a small number of customers might significantly alter the corporate profit picture, so the drive to improve service quality in the shipping sector has become an obsession. Some of the most popular methods used by businesses to enhance service quality include the use of cutting-edge technology, quick response to consumer requests, and delivery of accurate information in first response itself.

AI - Robotic Process Automation is the latest technology that will definitely fulfil the requirement of shipping industries to improve customer satisfaction. It will reduce the repetitive tasks of operation & increase efficiency and production by allowing employees to focus on more productive duties rather than repeated tasks. Shipping industries have a very large scope of opportunity to implement the RPA in different departments like Documentation – Export & Import, Operations – Equipment Management, Finance – Accounts payable & Accounts receivable, Customer service, Trade Management, and Human Resources.

3.3 Research Purpose and Questions

The principle aim of this thesis is to study how the Robotic Process automation technology will improve the productivity and efficiency in the Shipping Liner business and how it will improve customer satisfaction. It has been concentrated specifically on the

Shipping Liner industry with a concrete vision of improving Customer satisfaction, reducing repetitive tasks, reducing costs & Providing higher customer satisfaction with limited resources.

The most important conclusion is that there are four Service Quality dimensions that may be used to parsimonically express Service Quality in liner shipping. They rank in decreasing order of their impact on consumer satisfaction: value, responsiveness, speed, and dependability. Customer satisfaction is mostly predicted by speed and reliability.

There have been several studies carried out about Robotic Process Automation's impact on other industries like Health- Care, Logistic, and Banking, but no studies have been carried out about the Shipping liner business to date.

In order to achieve the aim of this study there has been selection of objective that has been set-

- Explore how the other industries implemented the RPA successfully.
- How to achieve the customer satisfaction in Shipping liner industries by giving fast service with accurate information
- Identify the advantages and disadvantage after implementing the RPA in the organization
- What organisation employee says about the RPA.

3.4 Research Design

The study used semi-structured interviews with open-ended and probing questions as part of a qualitative research strategy to answer the research questions. During these interviews, the researcher observes and records important information that will be utilised to determine themes. These themes were analyzed to develop a theoretical framework explaining the phenomenon. The study was descriptive, aiming to explore and explain these themes in the context of the shipping business. The research strategy is chosen to

align with the study's objectives, focusing on understanding the experiences and perspectives of the interviewees. The interview questions were tailored to uncover the business journey, pivotal moments, challenges faced, and strategic shifts.

3.5 Population and Sample

Despite being essential to qualitative methods, sampling has not gotten as much attention as data collection and analysis. Querstret & Robinson (2013) suggested a four-step sampling procedure for research based on qualitative interviews:

- Defining a sample universe with inclusion and exclusion criteria.
- Deciding a sample size balancing epistemological and practical concerns.
- Selecting a sampling strategy like random, convenience, stratified, cell, quota, or single-case.

The coherence, transparency, trustworthiness, and acceptance of this research depend on adherence to these points. Rai & Thapa (2015) claimed that the sampling technique's goal of acquiring information is not always simple because the researcher has to go through a massive amount of data, both primary and secondary. Therefore, it would be nearly impossible for researchers to complete the assignment with a big audience in such a scenario. Sample methods are used to choose a small group that is representative of the entire population. The sample itself is the data and addresses the research problem.

To select a sample, the researcher must establish criteria. Merriam (1998) suggested that these criteria define important attributes based on the study's purpose and theoretical framework. Given the industry's size variability, voluntary sampling will be used initially. Potential candidates will complete a Google form - Internet survey, followed by an interview. Interviews will be online or in person in English. Successful interviewees may refer other candidates, aligning with theoretical sampling principles (Merriam, 1998;

Taylor & Bogdan, 1984). Shipping Industries are very small globally so, the initial sample size is 3 companies, to be increased until data saturation.

3.6 Participant Selection

The participants of this study were selected based on the following criteria:

Table 3.1: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Employment	Employees currently working in shipping liner businesses across various departments.	Individuals not employed in shipping liner businesses.
RPA Experience	Employees working in companies that have implemented or plan to implement RPA.	Employees working in companies with no plans or consideration of RPA implementation.
Department	Employees working in departments relevant to RPA (e.g., Operations, Documentation, Customer Service, Finance).	Employees working in non-relevant departments that do not use or plan to use RPA in their processes.
Knowledge of RPA	Employees with basic to advanced knowledge of RPA (e.g., awareness or direct involvement).	Employees with no knowledge or involvement with RPA.
Company Size	Employees working in medium to large-sized shipping liner companies.	Employees working in small or non-shipping-related companies.
Willingness to Participate	Employees willing to provide insights through structured interviews (in-person or online).	Employees unwilling to participate or provide consent for interviews or surveys.

Customer Interaction	Employees involved in direct customer interaction or service delivery within the shipping liner industry.	Employees not involved in customer interaction or service-related roles.
Language	Employees proficient in the language used for the survey (e.g., English).	Employees not proficient in the language of the survey.

Source: - *Self Generated*

3.7 Instrumentation

For this research, two instruments were used to ensure that the collected data was relevant, valuable, and potentially helpful for the research. Information gathering from one or more people on a set of organisational topics is the goal of survey research in organisations. A Google Form poll was used as the initial tool. The second instrument was the semi-structured interviews conducted by the researcher. These interviews provided a deeper understanding of the businesses and their practices used in Shipping industries.

Google Form – Internet Survey

The Google Form survey was an essential part of the research process. At the start of each Google Form, the researcher provided an overview of the research objectives. It was created following the completion of the literature evaluation and the development of the main and supporting research questions. The survey has several uses:

1. Filtering out potentially irrelevant interviewees.
2. Gathering additional data to assist in asking pertinent questions during interviews.
3. Providing data for further analyses in the research.

The structured interviews will be comprised of the following information:

For employees who are currently working at the Shipping liner business –

1) Which continent are you currently based in?
    a. Asia
    b. Europe
    c. America
    d. Africa
    e. Far East and China
    f. Oceania
2) Is RPA (Robotic Process Automation) part of your operation?
    a. Yes
    b. No
    c. Not Applicable
3) Do you have planned to implement RPA in future years?
    a. Not considering
    b. Thinking about it
    c. Not Applicable
4) What stage are you at your RPA implementation Process?
    a. Not considering
    b. Thinking about it
    c. Testing
    d. Implemented
    e. Implemented & Expanding
5) How well does your leadership understanding the strategic need of RPA?
    a. Never heard about it
    b. Some awareness about RPA
    c. Good understanding about concept

d. Wanted to understand

e. Deep Understanding

6) If your company organization currently using RPA or plan to use RPA in future, in which following area will it used? **(Multiple Selection)**

a. Documentation – Export & Import Documentation

b. Customer service – Booking, Service Contract & Tenders

c. Operation – Equipment movement, Transport Order, Equipment lease contract, Port call Report

d. Finance – Accounts Payable, Accounts Receivable

e. Human Resources

7) Do you have agree that company productivity is positively related to level of RPA Implemented?

a. Fully Agreed

b. Partially Agreed

c. Not Agreed

d. Not applicable

8) Have you done any recent Customer Satisfaction survey after RPA Implementation?

a. Yes

b. No

c. Not applicable

9) Does your customer is satisfied the response time received from RPA - BOTs?

a. Fully Agreed

b. Partially Agreed

c. Not Agreed

d. Not applicable

10) What companies say about RPA Impact on Employee (by RPA Maturity) – **Multiple Selection**

    a. Many Employees are worried that their jobs will be displaced by automation
    b. Since RPA will handle basic activities, staff skills will become more analytical, interpersonal and strategic
    c. Our Organization works closely with employees to understand and address their concerns about RPA
    d. Our RPA implementation strategies include plans for training, developing, hiring and redeploying staff
    e. Most employees working with RPA are happy that many tasks have been automated

11) Have you consider developing a successful RPA Roadmap?

    a. A great Deal
    b. A lot
    c. A Moderate
    d. A little
    e. None at all

12) What does main reason to implement the RPA in your organization? – **Multiple Selection**

    a. Reduced the cost of doing business / Functional costs
    b. Improve Quality of Work
    c. Improved customer experience
    d. Increased Efficiency
    e. Others

13) Does your company have plan for Artificial Intelligence?

    a. Yes

b. No

14) What do you think will be the main challenges for AI implementation? – **Multiple Selection**

a. Budget availability
b. Competing investing
c. Management not convinced
d. Lack of resource to allocate for this project
e. Others

15) What's your overall opinion about RPA?

a. It’s Great deal, got immediate ROI
b. It’s Good but can be improve using other AI tool
c. It’s Ok, but Too Costly & doesn’t give benefit as expected ROI
d. It’s not Goof at all, can reduce the trust of customers
e. Others

The Interview

Interviews are essential when direct observation of behavior, feelings, or interpretations of the world is not possible (Merriam, 1998). Semi-structured interviews, in particular, offer flexibility, allowing interviewees to describe their experiences in their own words, providing rich data for researchers (J. W. Creswell, 2014). In this study, the following process was used to collect data from the interviews:

1. Each interviewee confirmed their willingness to participate in the research.
2. The researcher sent the interview questions beforehand to allow interviewees to recall relevant information.
3. A mutually agreed date and time for the interview was set between the researcher and interviewee.

4. Each interviewee was informed of their rights regarding the research and provided with details about the study.
5. The interviews were conducted over Zoom, a video conferencing app, with the interviewees' consent.
6. The researcher proposed the interview questions and asked follow-up questions based on the interviewees' responses.

At the start of each interview, the researcher provided an overview of the research objectives. The full list of questions is available in Appendix D. Here are some examples of the open-ended questions asked:

1. Can you describe the key challenges you believe exist in RPA in shipping business?
2. What were the major challenges your business faced during RPA implementation, and how were they overcome?
3. How did you convince the Management to apply for the RPA in your Industries?
4. How's your employee reacted after implemented RPA? Are they scared about their Job security?
5. How much time did it take to get ROI (Return of Investment) after implemented RPA?
6. How your customer feels after implementation RPA, whether it's give faster, accurate response to Customer? It has reduced the number of Errors.

3.8 Data Collection Procedures

Data for this study came primarily from primary and secondary sources. Semi-interviews with mid- to senior executives and a Google Form survey were used to gather primary data, or first-hand information. The Google Form survey has been sent to shipping industries experts. Secondary data, on the other hand, was obtained through a thorough

literature review, involving articles, journals, papers, and books relevant to the research topic.

To codify and analyze the collected data, the researcher took several steps. They prepared questionaries' in advance and shared them with Google Forms Survey. A framework was developed for storing and retrieving data, and a table was created to track the frequency of key words to identify themes. Redundant and irrelevant data were removed to focus on relevant information for analysis.

The data collection process is summarised below:

Google Form:

1. Created Google Form.
2. Google Forms has all types of Questions which the interviewer should select, i.e. Single selection or Multiple Selections.

Interview:

1. Create a screener survey for potential interviewees.
2. Create a set of probing questions to ask each interviewee. Each interview should last an estimated 30 – 45 minutes.
3. Fix a period for the interviews to be held.
4. Reach out to potential interviewees through various channels such as email, messaging services etc.
5. Ask each responding individual to complete the screener survey.
6. Each interviewee will be asked to sign and return the consent forms.
7. A date and time will be fixed with each interviewee for the interview.
8. The interview will be conducted over a video conferencing tool such as Zoom, and will be recorded. Interviews will be conducted in English

9. A copy of the recording will be provided to the interviewee for fact checking and confirmation. The recording will be transcribed soon after the conclusion of the interview.
10. The researcher will use observation techniques to ask deeper, more pointed questions based on the interviewee's answers
11. The core questions and sub-questions of the research will be answered through an abductive approach.

Interview questions will be prepared in advance, and participants will be informed of the interview time and date to prepare adequately. To ensure confidentiality, participants will be briefed on their rights and the interview consent form.

3.9 Data Analysis

Collecting data for qualitative research often involves interviewing individuals with relevant lived experiences. Researchers are responsible for selecting interviewees, requiring them to possess knowledge about the subject matter. This knowledge is acquired through the researcher's own life experiences and a thorough literature review on the research topic. Analyzing these life experiences is complex and time-consuming, and it requires the researcher to develop a systematic approach for analysis, codification, and interpretation of the collected data. Hayhoe & Brewer (2020) outline several major steps in this process.

- **Good analysis depends on Understanding the Data**: To conduct effective qualitative analysis, it's crucial for researchers to thoroughly review the collected data and make detailed notes. This helps in understanding the context and content of the data, while filtering out less informative or biased portions.
- **Review the Purpose of the Evaluations**: Researchers should align their analysis with the research goals and questions. Identify the Key questions that you want

analysis to answer. This involves organizing data based on the Google form questions to identify consistencies and differences in responses, thus ensuring that the analysis remains focused on the research objectives.

- **Categorize Information**: Unlike quantitative analysis where numerical codes are used, qualitative data is categorized based on themes, patterns, and coherent categories. Identify the themes or Patterns, New or emerging themes should also be categorized, and each category should have labels for relevant subcategories.
- **Identify Patterns and Connections**: Organizing data into themes and categories helps in identifying patterns and connections within and between categories. The relative importance of these patterns can be determined based on their frequency and context, mapping them to the central and sub questions of the research. On the other hand, the coded data was analyzed using SPSS also known as Statistical Packages for Social Sciences software.
- **Interpretation:** Using the identified themes and connections, researchers attempt to explain the findings of the study. It's important to focus on interpreting the data concisely and not get lost in detail.

In summary, to effectively categorize data, the researcher must transcribe Google Survey result and analyze This ensures familiarity with the data and prevents missing or misinterpreting the context of each answer. Key passages and information should be highlighted to avoid overlooking important details.

3.10 Coding and Analysis

The coding process in this research was structured based on (Hayhoe and Brewer, 2020) work and comprised three phases: review, coding, and analysis.

During the review phase, the researchers familiarized themselves with the Google Form Survey result & Semi- interview transcriptions, initially focusing on pre-set themes.

As they reviewed the data, new themes emerged, which were noted. Additionally, the researcher marked similarities and differences between Google Form Survey results & Semi- interview responses.

In the coding phase, the researcher applied labels (abbreviations of pre-set and emergent themes) to key phrases identified in the review phase. They also assigned relative importance to each theme based on frequency and the value attributed by interviewees.

In the analysis phase, the researcher used the themes to explain various phenomena observed in the data. They highlighted and discussed the reasoning behind interview responses, using patterns that emerged from the data analysis.

3.11 Methods of Validation

The quality of research hinges on its ability to withstand scrutiny in terms of reliability and validity. Mohamad & Tasir (2014) suggest that research must address dependability, transferability, credibility, and conformability. In qualitative analysis, researchers ensure data trustworthiness through transcript analysis, triangulation, and verification. Each interview transcript is analyzed multiple times, and copies are sent to interviewees for verification. Interviewees are also given the opportunity to modify the researcher's conclusions, ensuring correct interpretation of their answers.

Reliability refers to the likelihood of similar research, using the same parameters, yielding the same results. Fusch & Ness (2015) describe triangulation as using multiple strategies such as Google Form survey, interviews, observations, and literature to gain perspectives on the same phenomenon. By using multiple data collection methods, the risk of a single approach is minimized.

Qualitative research analysis must incorporate different viewpoints to understand the analysis's importance. The researcher ensured that interview questions were clear and understood by the interviewees before listening to their responses. After the interview, a

copy of the recording was sent to the interviewees to verify their responses. The interview was then transcribed, and interviewees were asked to verify its contents, ensuring the study's reliability.

To ensure research results are trustworthy, researchers must adhere to the principles of integrity, transferability, and reliability. K. Yin (2019) suggests that research validity is dependent on the quality of the research process and must not be impaired at any stage. Therefore, research validity is a metric to measure research quality. Because qualitative analyses rely on the researcher's understanding and interpretation of data, the results and findings must be consistent and verifiable to contribute to existing knowledge and propose future research.

3.12 Research Design Limitations

There are restrictions on this study that could limit how broadly the results can be applied. The study's restricted sample size was based on a Google Form Survey and Semi-Interview. selected using random sampling survey, which may not fully represent the experiences of all businesses in the Shipping & Maritime industry. However, the quality of the data is more important than the size of the sample.

Although interviewees were given enough time to prepare, they may not have accurately recalled incidents or may have missed details that could impact the research outcomes. Furthermore, the study makes the assumption that interviewees were subject-matter experts at the time of the interview.

Even though respondents were guaranteed secrecy, it's possible that their responses didn't fully capture their experiences.

CHAPTER IV:

RESULTS

4.1 Introduction

The research findings and main conclusions are covered in this chapter. This chapter is organized broadly into two sections: the research case is covered in the first section which includes information about the study of survey participants and their background information. In 2nd Section, the researcher's data analysis was done following the Google survey and interview.

4.2 The Research Case

This section details the types of publishers and developers chosen for the study, the background of the participants and finally, some context about the Shipping Industries experts, RPA consultants, and Shipping Customers. It provides a lens through which the rest of the study can be viewed.

Types of Participants Chosen for The Study

For this study, the researcher considered two approaches to the selection of publishers and developers. All participants submitted the survey through the Google form & some of them collected data through Interviews. All participants represented Shipping Business Experts, Customers & RPA consultants working for Shipping Business Organizations. The researcher has chosen participants working in different departments of Shipping Lines. During the survey, participants were asked questions about their roles, positions, years of experience and how long they were engaged with the business they represented. The Researcher shared the Google Survey with Shipping Liner Experts audience where RPA has been implemented or yet to implemented in their organization.

Table 4.1: Which continent are you currently based in?

	Frequency	Percent
Asia	25	64.1
Europe	3	7.7
America	1	2.6
Africa and Gulf	6	15.4
Far East and China	3	7.7
Oceania	1	2.6
Total	39	100.0

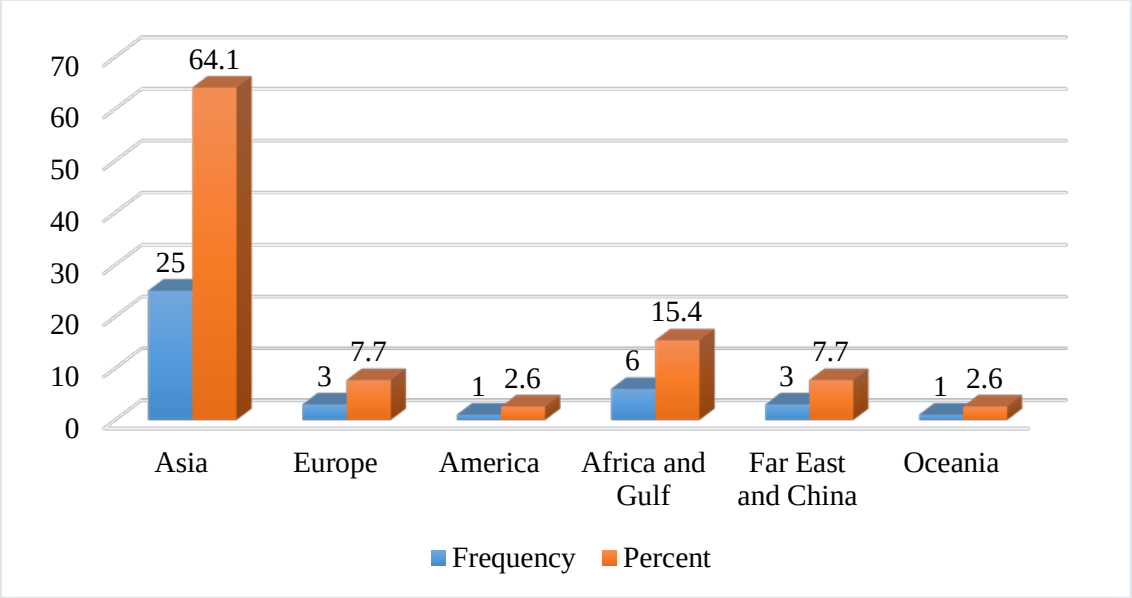

Figure 4.1: Which continent are you currently based in?

Figure 4.1 above demonstrates a notable concentration on the Asian continent, with 64.1% of respondents based there. There are smaller percentages in other regions, with Europe, the Far East, and China each making up 7.7% and Africa and the Gulf 15.4%. At a combined 2.6%, America and Oceania are the least represented.

Table 4.2: Is RPA (Robotic Process Automation) part of your operation?

	Frequency	Percent

Yes	34	87.2
No	4	10.3
Not Applicable	1	2.6
Total	39	100.0

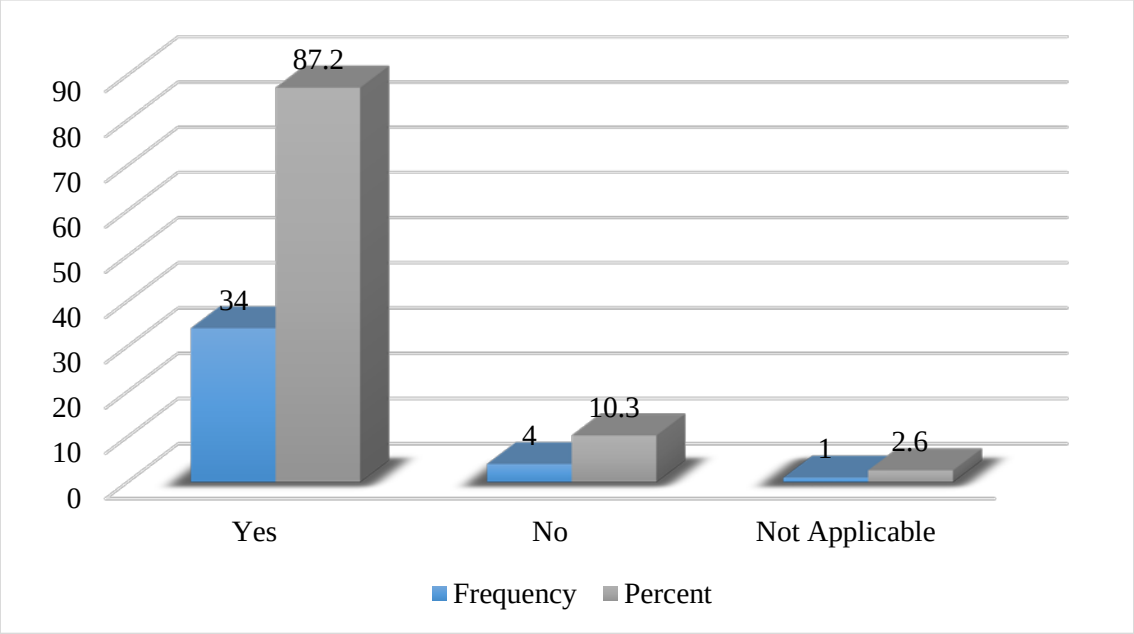

Figure 4.2: Is RPA (Robotic Process Automation) part of your operation?

The Robotic Process Automation (RPA) has been widely adopted, as evidenced by the fact that 87.2% of respondents use it in their operations, as seen in Figure 4.2 above. RPA is not used by a lesser percentage (10.3%), and 2.6% believe it is not applicable to their business.

Table 4.3: Do you have plans to implement RPA in future years?

	Frequency	**Percent**
Not Considering	3	7.7
Thinking About It	33	84.6
Not Applicable	3	7.7
Total	39	100.0

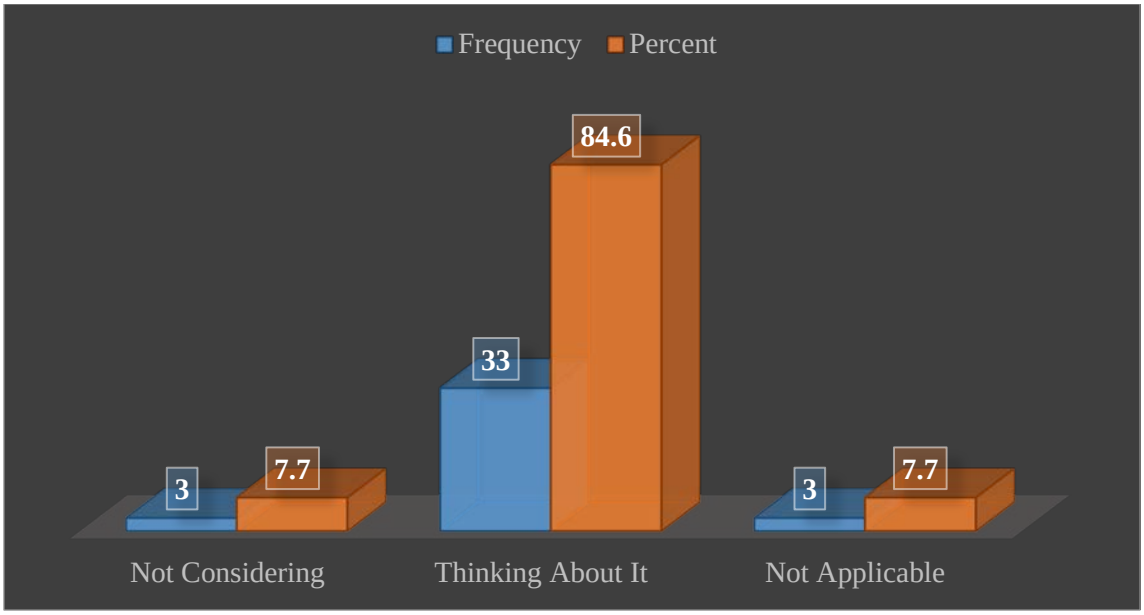

Figure 4.3: Do you have plans to implement RPA in future years?

According to the Figure 4.3 above, a majority of respondents—84.6%—are thinking about using robotic process automation (RPA) in the future, suggesting that there is a high level of interest in and room for expansion in the use of RPA technology. Just 7.7% are not considering and an equal percentage find it not applicable to their situation.

Table 4.4: What stage are you at in your RPA implementation Process?

	Frequency	**Percent**
Not Considering	4	10.3
Thinking About It	6	15.4
Testing	1	2.6
Implemented	5	12.8
Implemented & Expanding	23	59.0
Total	39	100.0

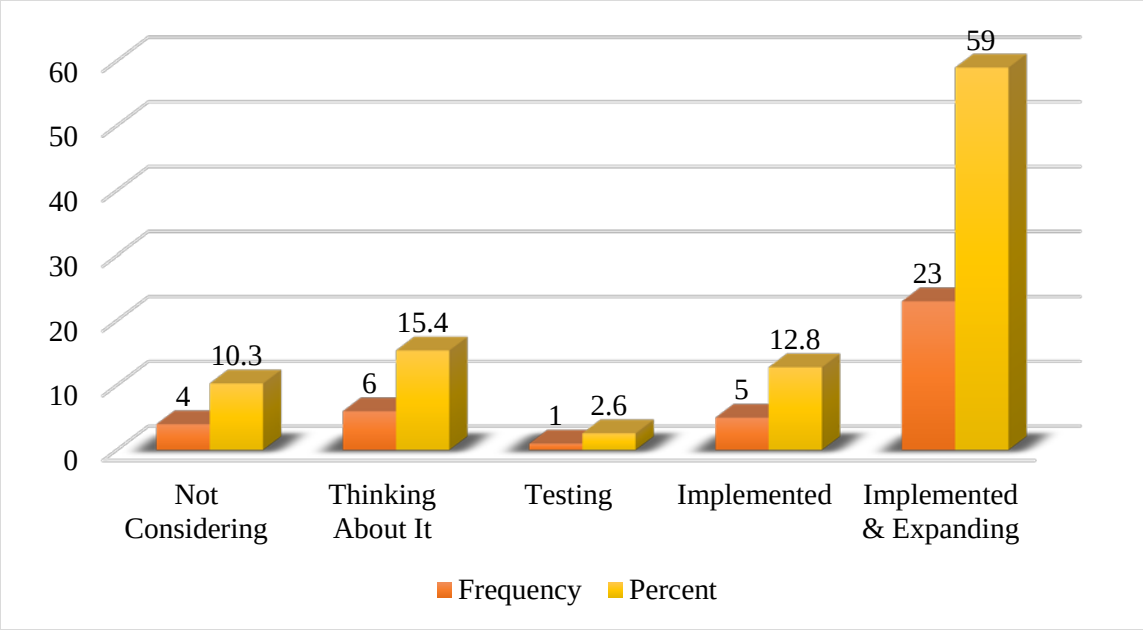

Figure 4.4: What stage are you at your RPA implementation Process?

The majority of respondents, or 59.0%, have implemented Robotic Process Automation (RPA) and are increasing its use, as seen in Figure 4.4 above. Also, a smaller percentage, 2.6%, is still in the testing phase, whilst 12.8% have finished the implementation. 10.3% are not considering RPA, while 15.4% are thinking About It.

Table 4.5: How well does your leadership understand the strategic need of RPA

	Frequency	**Percent**
Some Awareness About RPA	7	17.9
Good Understanding About Concept	23	59.0
Wanted to Understand	1	2.6
Deep Understanding	8	20.5
Total	39	100.0

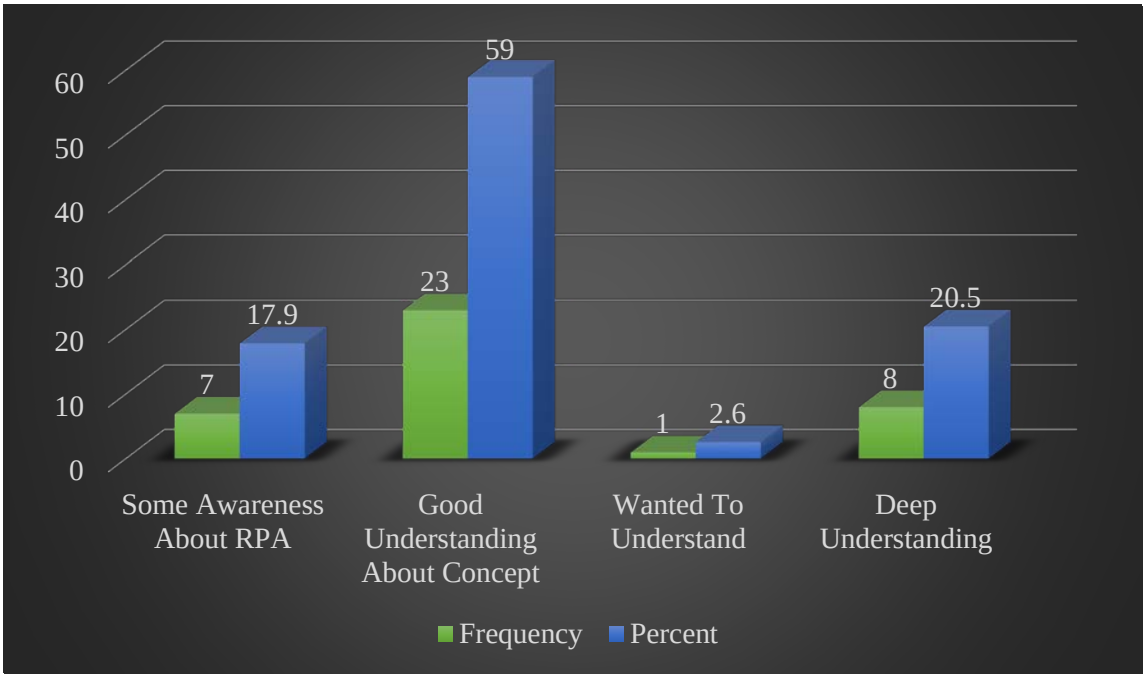

Figure 4.5: How well does your leadership understand the strategic need of RPA?

The above figure shows that the majority of respondents, 59.0%, observe their leadership as having a good understanding of the strategic need for Robotic Process Automation (RPA). Additionally, 20.5% report that their guidance has a deep understanding of RPA's strategic significance. Meanwhile, 17.9% indicate that their leadership has only some awareness of RPA, and a small portion, 2.6%, express a desire to learn more.

Table 4.6: Do you agree that company productivity is positively related to the level of RPA Implemented?

	Frequency	**Percent**
Fully Agreed	30	76.9
Partially Agreed	9	23.1
Total	39	100.0

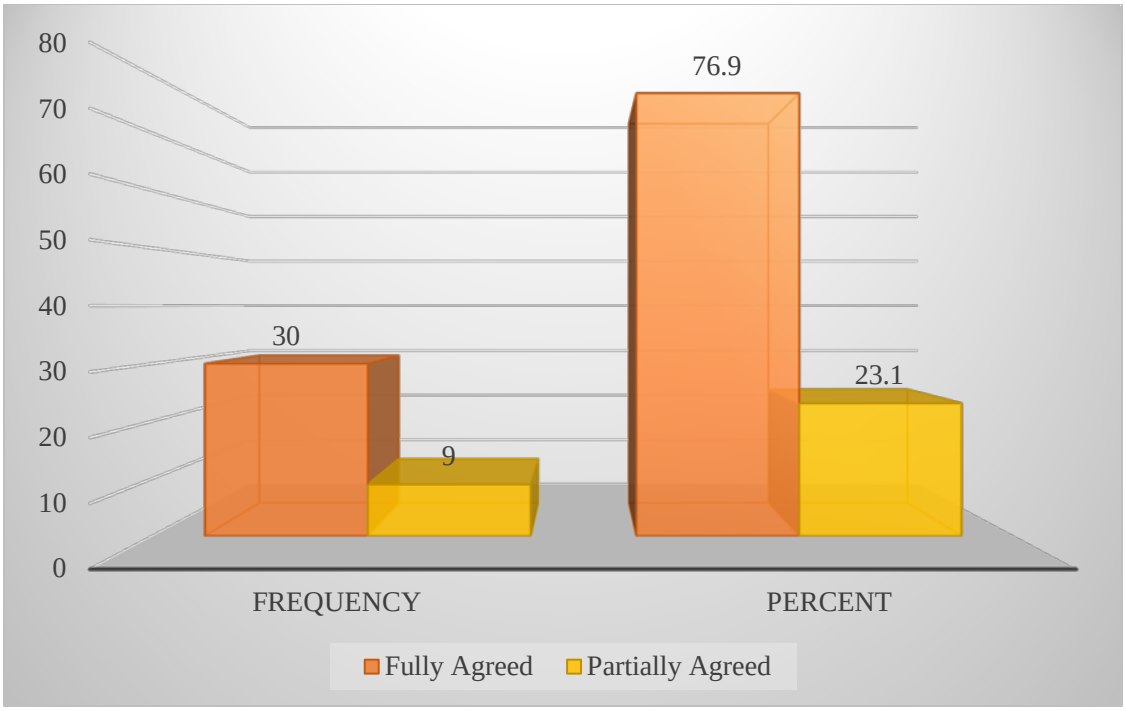

Figure 4.6: Do you agree that company productivity is positively related to the level of RPA Implemented?

The above figure 4.6 shows that company productivity is positively related to the level of Robotic Process Automation (RPA) implemented, a significant majority of respondents, 76.9% fully agree. The remaining 23.1% partially agree, suggesting they recognize some benefits but may perceive limitations or conditional factors.

Table 4.7: Have you done any recent Customer Satisfaction survey after RPA Implementation?

	Frequency	**Percent**
Yes	14	35.9
No	23	59.0
Not Applicable	2	5.1
Total	39	100.0

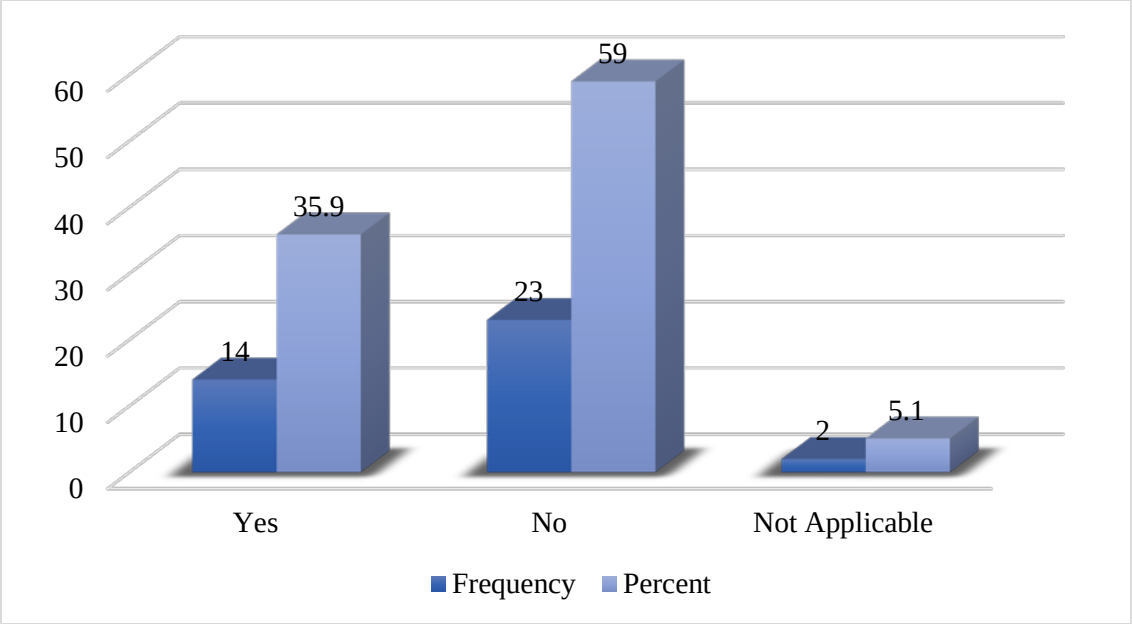

Figure 4.7: Have you done any recent Customer Satisfaction survey after RPA Implementation?

According to the Figure 4.7 above, 35.9% of respondents said they had recently completed a customer satisfaction survey after Robotic Process Automation (RPA) was implemented. This suggests that some effort to measure the impact of RPA on customer experiences. However, a greater proportion, 59.0%, have not carried out such a survey, and 5.1% believe it is not applicable.

Table 4.8: Does your customer is satisfied the response time received from RPA - BOTs?

	Frequency	**Percent**
Fully Agreed	15	38.5
Partially Agreed	15	38.5
Not Applicable	9	23.1
Total	39	100.0

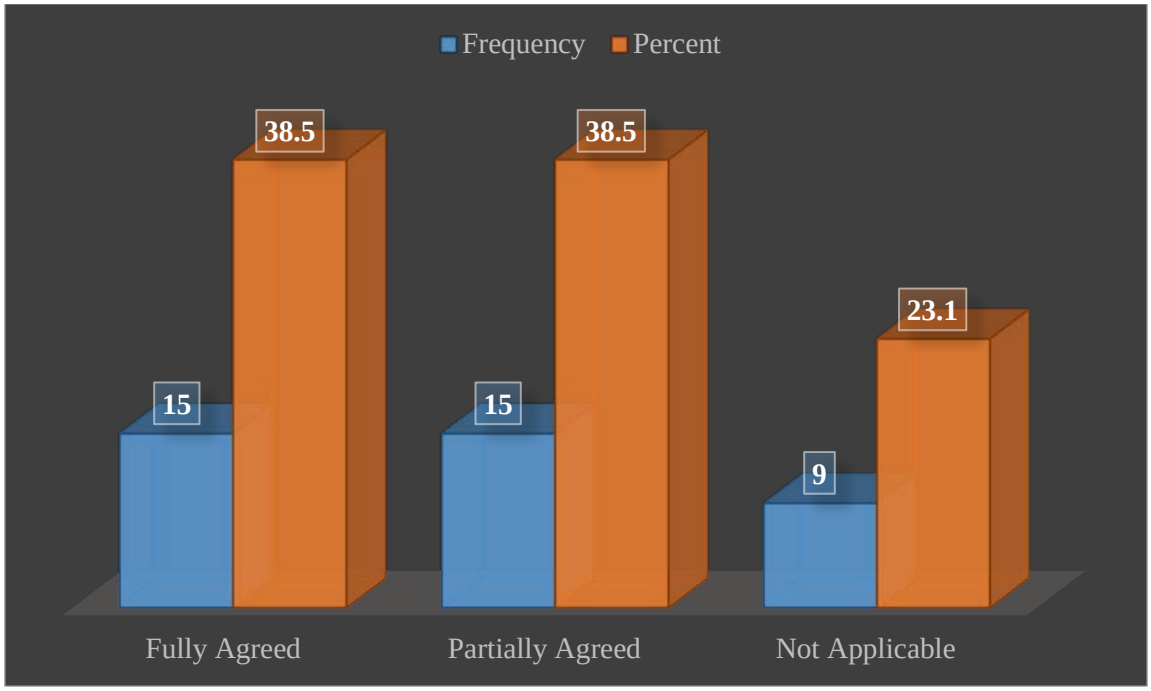

Figure 4.8: Does your customer is satisfied the response time received from RPA - BOTs?

According to the data shown in above figure 4.8, there is a high degree of consumer satisfaction with the response time that RPA bots deliver. 38.5% of respondents partially and fully agree, indicating that although there is some customer satisfaction, However, 23.1% of respondents believe this topic is not applicable, which may suggest that some businesses do not use RPA bots in customer-facing positions.

Table 4.9: Have you consider developing a successful RPA Roadmap?

	Frequency	**Percent**
A Great Deal	18	46.2
A Lot	9	23.1
A Moderate	7	17.9
A Little	5	12.8
Total	39	100.0

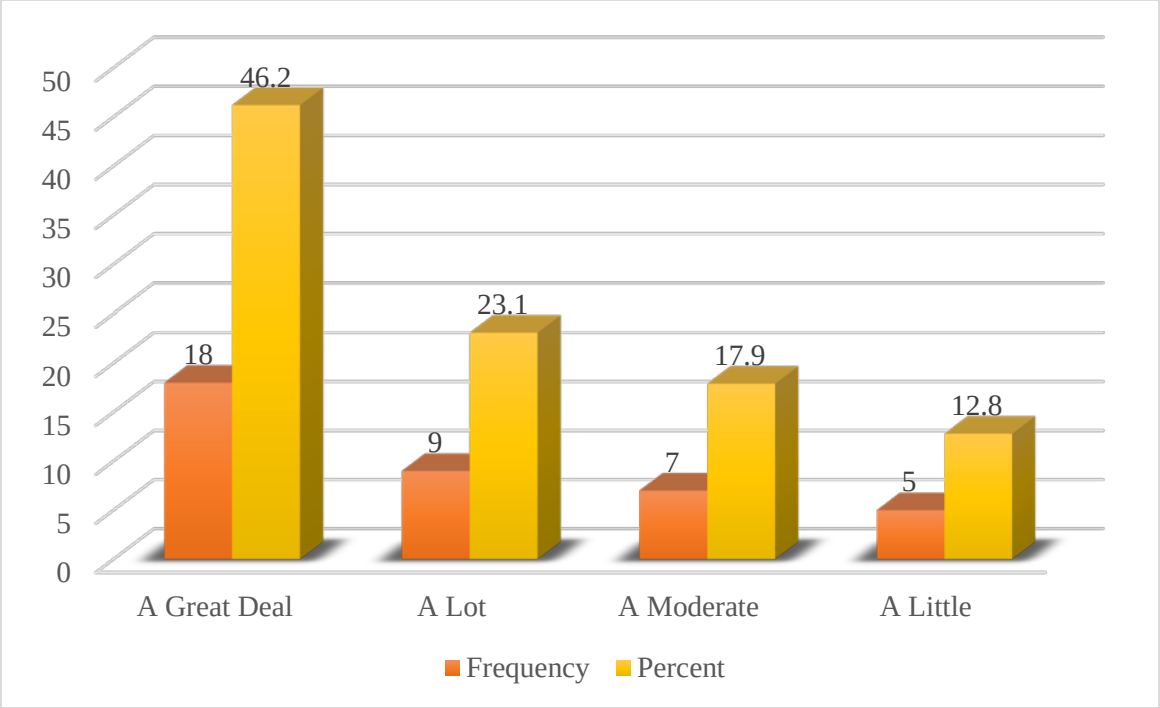

Figure 4.9: Have you considered developing a successful RPA Roadmap?

As seen in Figure 4.9 above, 46.2% of respondents have considered developing a successful RPA Roadmap plan, indicating a significant commitment to organised RPA adoption. Furthermore, 17.9% have moderately considered it, and 23.1% have given it considerable thought. A smaller portion, 12.8%, have given it only a little consideration.

Table 4.10: Does your company have a plan for Artificial Intelligence?

	Frequency	**Percent**
Yes	25	64.1
No	14	35.9
Total	39	100.0

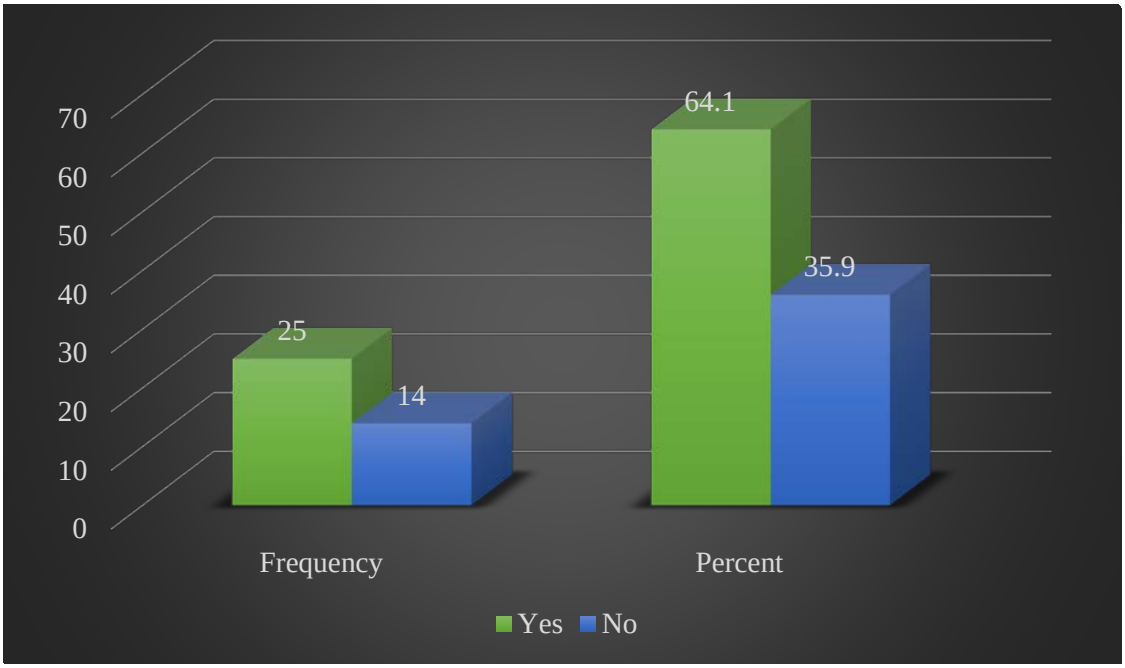

Figure 4.10: Does your company have a plan for Artificial Intelligence?

According to Figure 4.10 above, 64.1% of companies have plans for Artificial Intelligence (AI), showing a high desire to do so. However, 35.9% do not, indicating that some businesses are not yet giving AI efforts top priority.

Table 4.11: What's your overall opinion about RPA?

	Frequency	**Percent**
It's Great deal, got immediate ROI	10	25.6
It's Good but can be improve using another AI tool	27	69.2
It's Ok, but Too Costly & doesn't give benefit as expected ROI	1	2.6
Others	1	2.6
Total	39	100.0

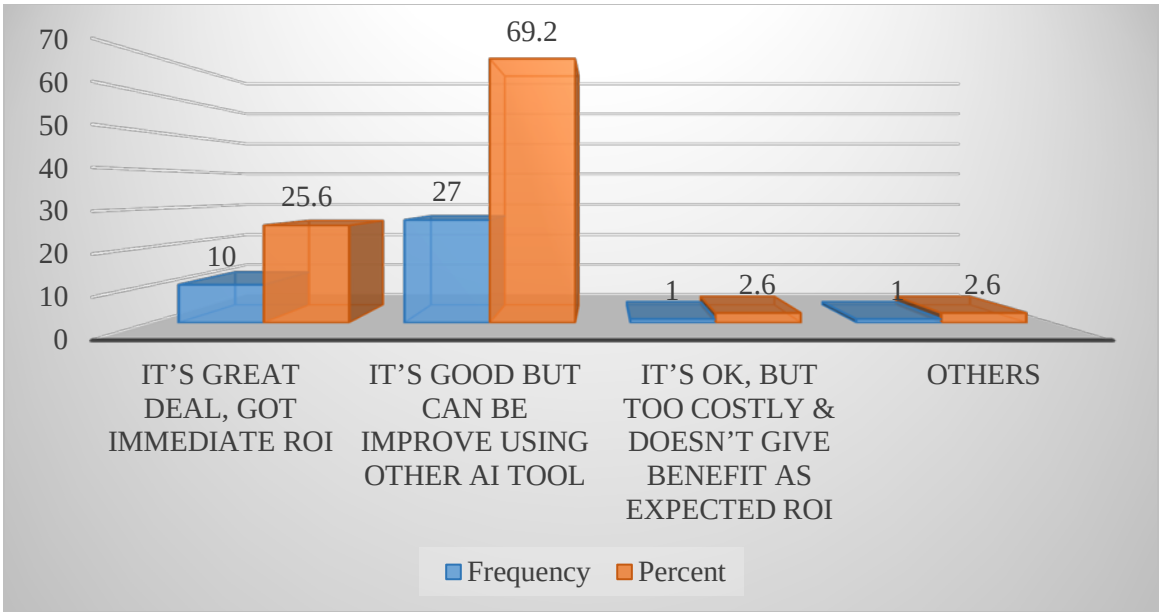

Figure 4.11: What's your overall opinion about RPA?

The above figure 4.11 shows that a majority of respondents, 69.2%, view Good but can be improved using other AI tools. Meanwhile, 25.6% feel that RPA has been highly beneficial, Great deal, got immediate ROI. A small percentage, 2.6%, find it too costly with limited benefits, and another 2.6% have other opinions.

Table 4.12: Have you implemented any other solution along with RPA to improve Productivity?

	Frequency	Percent
Machine Learning - Python, R	4	10.3
Optical Character Recognition (OCR)	5	12.8
Intelligent Document Processing (IDP)	4	10.3
Pattern Recognition	3	7.7
Natural Language Program or Conversational AI	10	25.6
Not aware about it	3	7.7
Not Applicable	10	25.6
Total	39	100.0

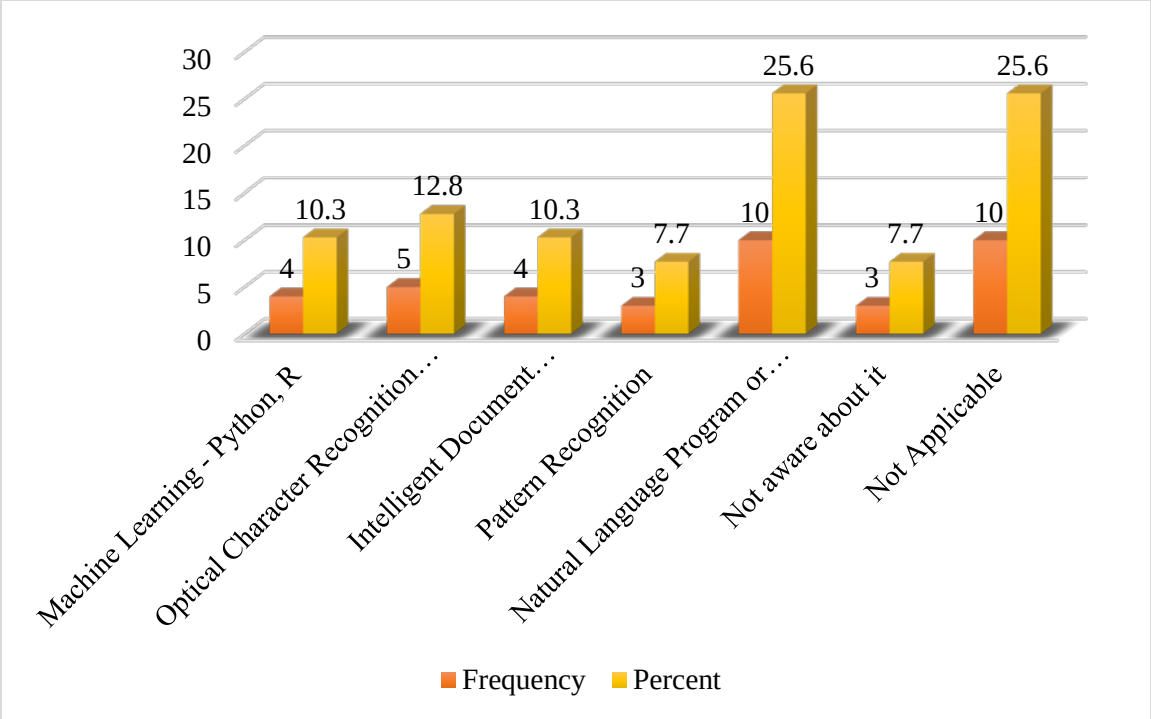

Figure 4.12: Have you implemented any other solution along with RPA to improve Productivity?

The above figure 4.12 shows that implementing any other solution along with RPA to improve Productivity. meanwhile, 25.6% of respondents have (NLP) or Conversational AI and another 25.6% consider it not applicable. Optical Character Recognition (OCR) has been adopted by 12.8%, and both Machine Learning (Python, R) and Intelligent Document Processing (IDP) have been implemented by 10.3% each. Pattern recognition is used by 7.7%, and an equal percentage are not aware of these technologies.

Table 4.13: Have your KPI (Key Performance Indicator) is improved after RPA Implementation?

	Frequency	**Percent**
Fully Agreed	27	69.2
Partially Agreed	9	23.1
Not Applicable	3	7.7
Total	39	100.0

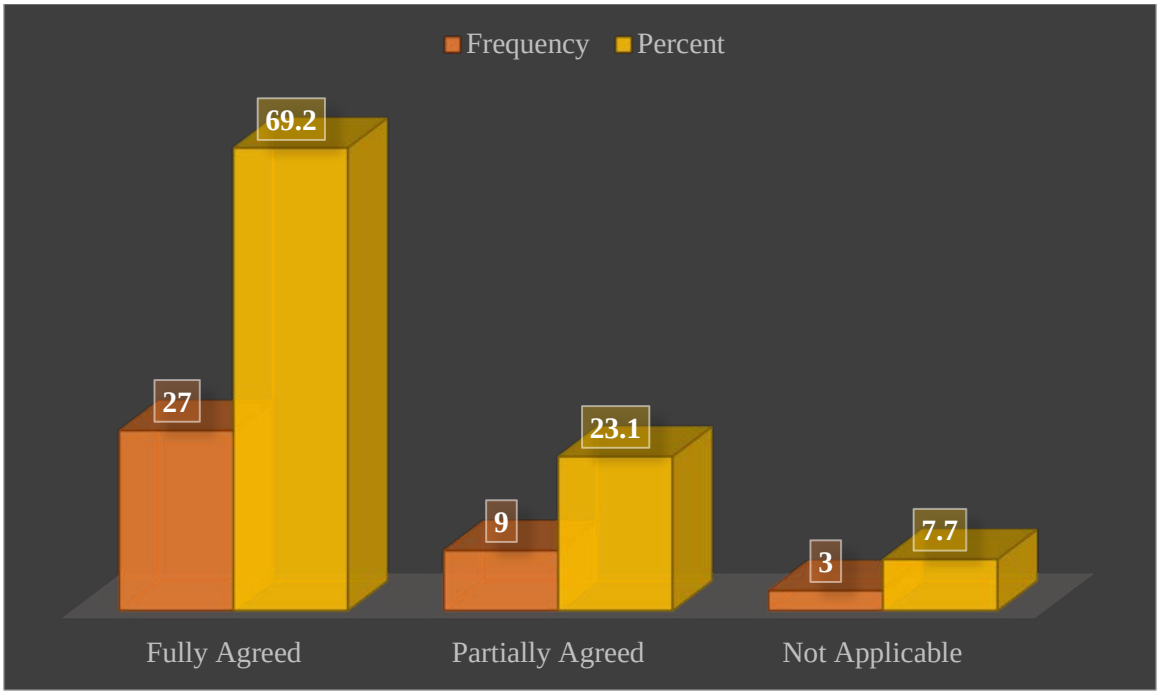

Figure 4.13: Have your KPI (Key Performance Indicator) is improved after RPA Implementation?

According to the above figure 4.13 shows that their Key Performance Indicators (KPIs) have improved following the implementation of Robotic Process Automation, whereas 69.2% of respondents fully agree. Additionally, 23.1% partially agree, suggesting some improvement. Meanwhile, 7.7% find this not applicable.

Table 4.14: Does RPA deliver Good ROI (Return on Investment)?

	Frequency	**Percent**
Average ROI	9	23.1
Good ROI	28	71.8
High ROI	2	5.1
Total	39	100.0

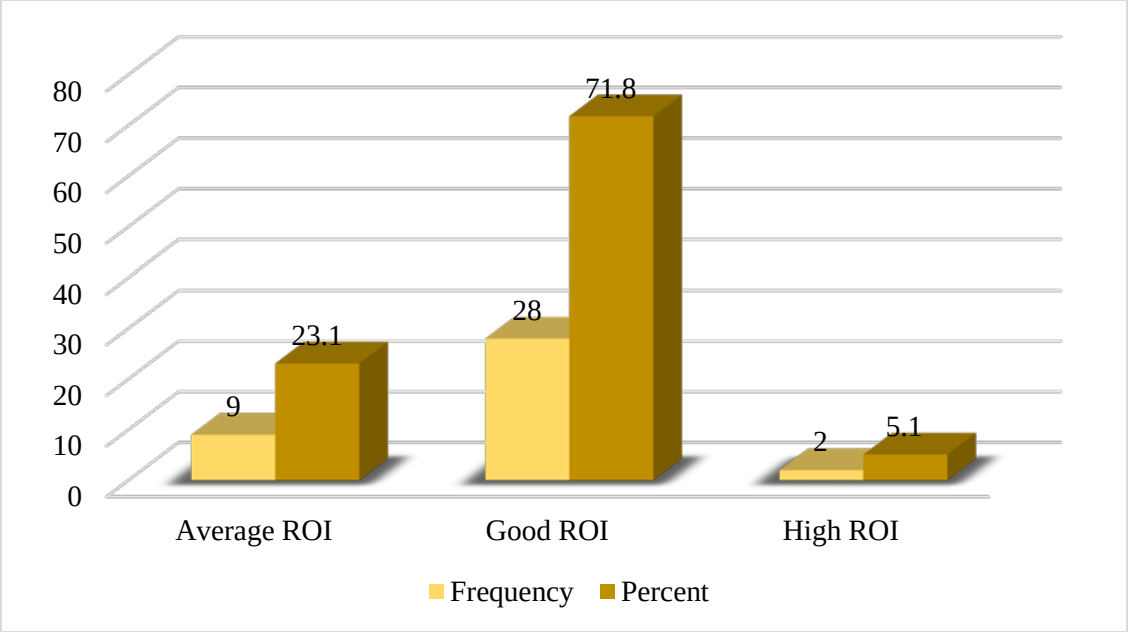

Figure 4.14: Does RPA deliver Good ROI (Return on Investment)?

The implementation of robotic process automation (RPA) return on investment (ROI) by 71.8% of respondents, and 23.1% consider the ROI to be mediocre, as shown in Figure 4.14 above. Only 5.1% said they have seen a significant return on investment with RPA.

Table 4.15: If your company organization is currently using RPA or plans to use RPA in future in which following areas, will it be used?

	Frequency
Documentation – Export & Import Documentation	29
Customer service – Booking	22
Service Contract & Tenders	31
Operation – Equipment movement	28
Transport Order	29
Equipment lease contract	29
Port call Report	29
Finance – Accounts Payable	19

Accounts Receivable	19
Human Resources	7

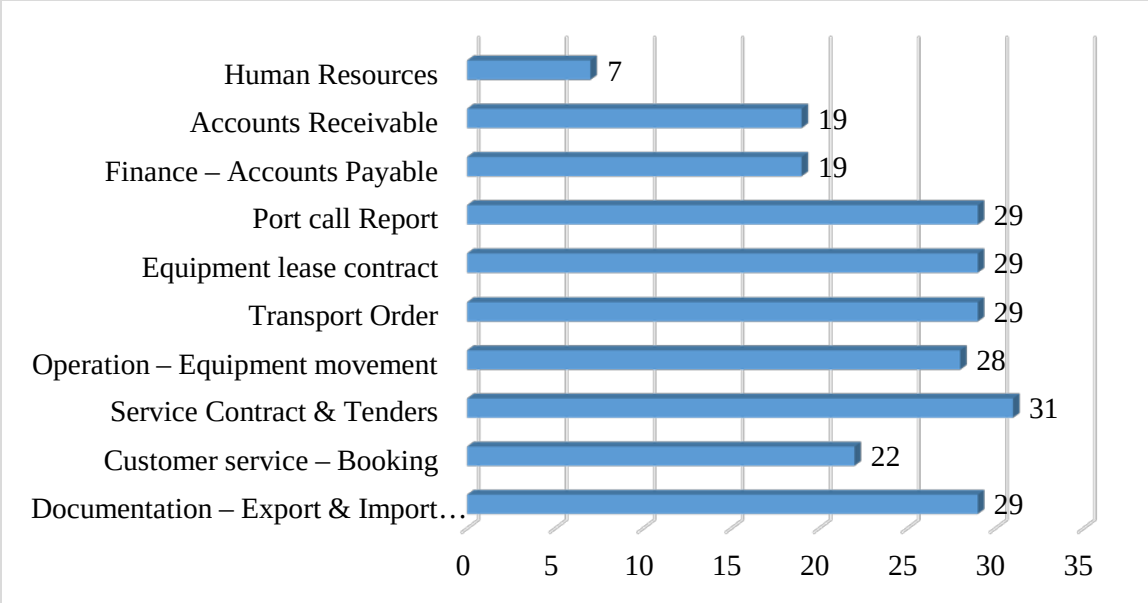

Figure 4.15: If your company organization is currently using RPA or plans to use RPA in future in which the following areas, will it be used?

The above figure shows how Robotic Process Automation (RPA) is being or will be used in several organisational functional areas. Of these, Service Contracts & Tenders (31), Export & Import Documentation (29), Transport Orders (29), Equipment Lease Contracts (29), Port Call Reports (29), and Equipment Movement Operations (28) have adopted RPA at a significant rate. Customer service applications like booking have slightly lower usage (22), while financial procedures, such as accounts payable and receivable, are as important (19 each). Human Resources shows the least implementation or planned adoption of RPA (7), suggesting a lower emphasis on automating HR processes.

Table 4.16: What is the main reason to implement the RPA in your organization?

	Frequency
Reduced the cost of doing business / Functional costs	33
Improve Quality of Work	38

Improved customer experience	26
Increased Efficiency	36
Others	69

Figure 4.16: What is the main reason to implement the RPA in your organization?

The organization's main motivations for implementing Robotic Process Automation (RPA) are varied, as shown in the Figure 4.16 above. There is a significant emphasis on improving the quality of work (38) and increasing efficiency (36). A significant portion of respondents indicated "Others" (69) as their primary reason, even if reducing functional costs (33) and enhancing customer experience (26) is also crucial.

Table 4.17: What do you think will be the main challenges for AI implementation?

	Frequency
Budget availability	30
Lack of resources to allocate for this project	7
Competing investing	11
Others	8

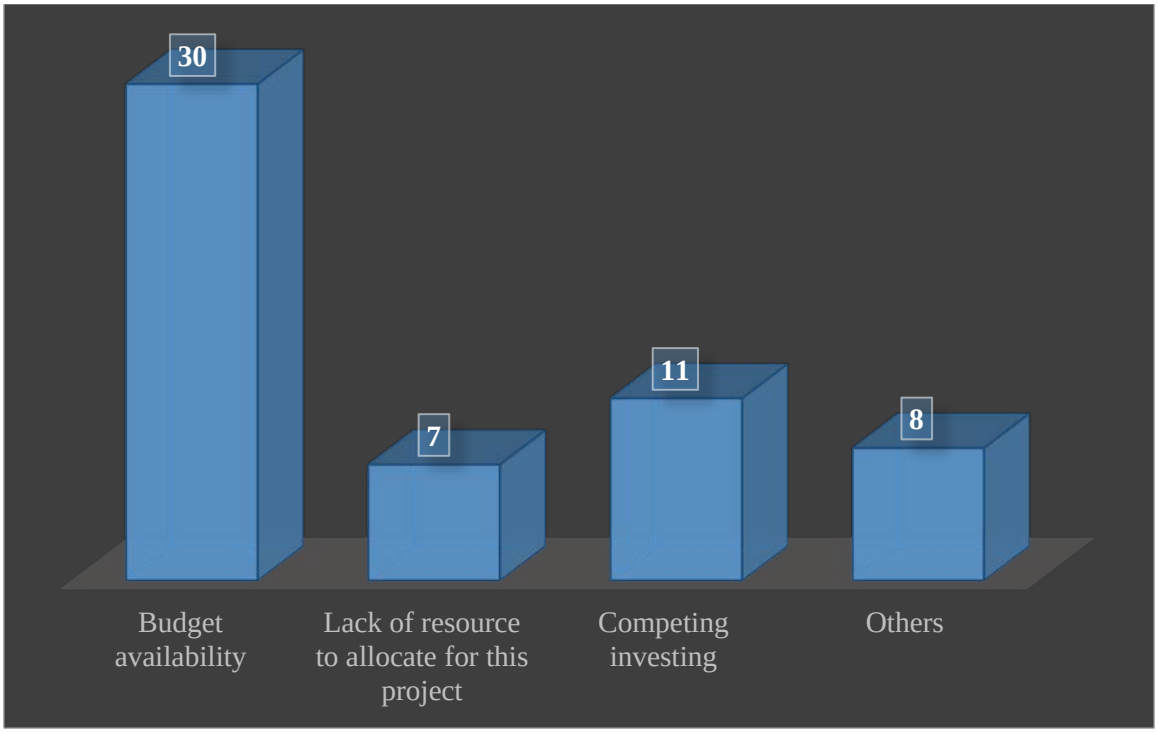

Figure 4.17: What do you think will be the main challenges for AI implementation?

The above figure 4.17 shows that the main challenges anticipated for AI implementation in the organization Centre around budget availability, which is the most frequently cited concern (30). Other challenges include competing investment priorities (11) and a lack of resources available for allocation to AI projects (7). Additionally, a smaller proportion of respondents (8) indicated "Others," suggesting there are additional less commonly acknowledged obstacles that may impact AI adoption.

Table 4.18: Test Statistics

Null Hypothesis	Test	N	Sig.	Decision
Which continent are you currently based in?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.
Is RPA (Robotic Process Automation) part of your operation?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.

Do you have planned to implement RPA in future years?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.
What stage are you at in your RPA implementation Process?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.
How well does your leadership understand the strategic need of RPA?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.
If your company organization is currently using RPA or plan to use RPA in future, in which following area will it used?	One-Sample Chi-Square Test	39	0.699	Retain the null hypothesis.
Do you agree that company productivity is positively related to level of RPA Implemented?	One-Sample Binomial Test	39	0.001	Reject the null hypothesis.
Have you done any recent Customer Satisfaction survey after RPA Implementation?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.
Does your customer is satisfied the response time received from RPA - BOTs?	One-Sample Chi-Square Test	39	0.397	Retain the null hypothesis.

What companies say about RPA Impact on Employee (by RPA Maturity)	One-Sample Chi-Square Test	39	0.533	Retain the null hypothesis.
Have you consider developing a successful RPA Roadmap?	One-Sample Chi-Square Test	39	0.018	Reject the null hypothesis.
What does main reason to implement the RPA in your organization?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.
Does your company have plan for Artificial Intelligence?	One-Sample Binomial Test	39	0.109	Retain the null hypothesis.
What do you think will be the main challenges for AI implementation?	One-Sample Chi-Square Test	39	0.009	Reject the null hypothesis.
What's your overall opinion about RPA?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.
Have you implemented any other solution along with RPA to improve the Productivity?	One-Sample Chi-Square Test	39	0.110	Retain the null hypothesis.
Have your KPI (Key Performance Indicator) is improved after RPA Implementation?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.

Does RPA deliver Good ROI (Return on Investment)?	One-Sample Chi-Square Test	39	0.000	Reject the null hypothesis.

The statistical analysis employing one-sample Chi-Square and Binomial tests, as shown in the Table 4.18 above, offers insights into several facets of RPA and AI applications inside the company. The findings show that the null hypothesis was disproved for the majority of the variables, pointing to important correlations. This covers elements such as the continent of operation, the use of RPA now and in the future, the strategic knowledge of the leadership, the rationale behind the use of RPA, the difficulties with AI, the effect of RPA on productivity, and improvements in KPIs after adoption. The null hypothesis, however, was kept for topics including the precise use of RPA, customer happiness with RPA-BOTs, RPA's effect on workers, plans for AI, and other solutions in addition to RPA, suggesting no significant correlation in these instances.

Booking Cycle Process

The booking process is the initial process in Shipping Industries where customers contact the Shipping Liner to book the Cargo.

Customers submit the Booking Request through EDI or Shipping lines Websites or Emails. Customer Service Booking Department Users will check all mandatory columns required to Book the Shipment. It will send an RFI (Request for Information) if any information is required for details or Clarifications. After Clearing all Errors for all Bookings. Booking Users will check the Customer Profile & Country regulations applied. Booking Users will verify all information and Accept or Decline the Bookings.

- **AS-IS Process**

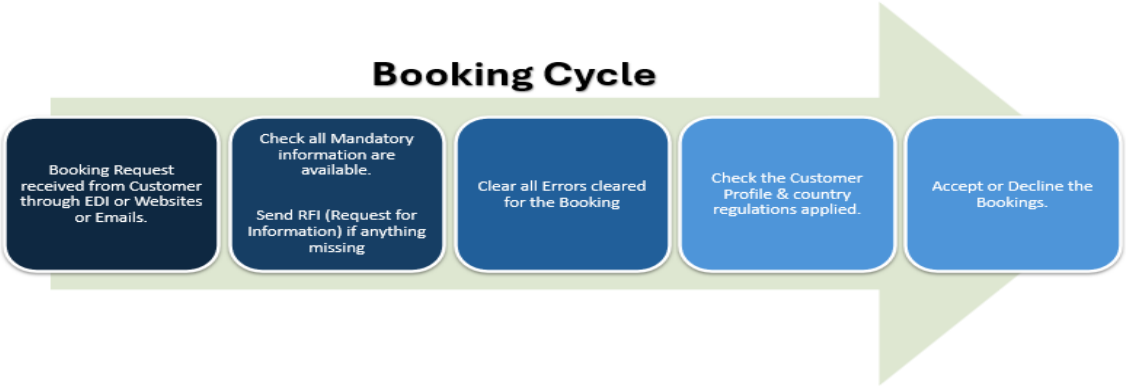

Figure 4.18: Booking Cycle Process (AS-IS Process)

Robotics Process Automation BOTs can be implemented on the below Process Steps where BOT can do more faster the human, accurate without any Errors. It will work 24*7 without any interruption. RPA BOT can read the booking request received from the Customer through EDI or Website or Email as well. It validates all information and reverts to the respective customer. RPA BOT can read the response received from the Customer and accept or Decline the Booking without any Manual Interventions.

- **TO-BE Process**

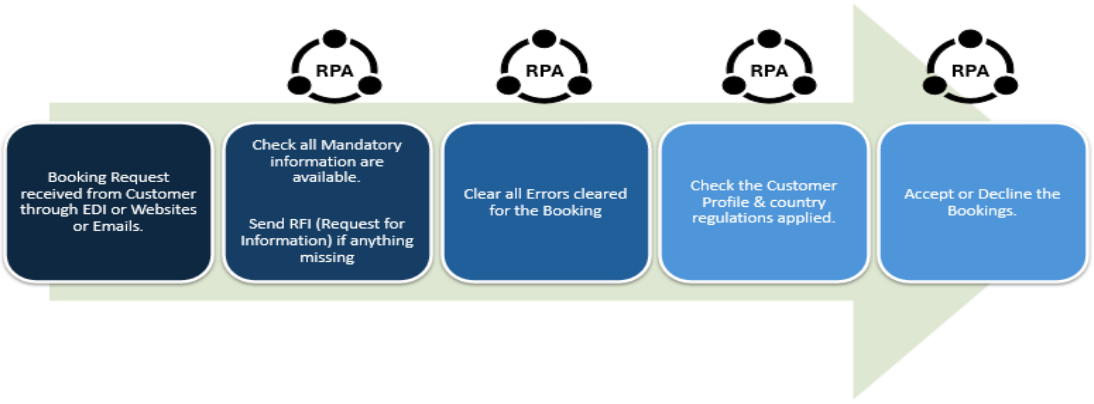

Figure 4.19: Booking Cycle Process (TO-BE Process)

Export Documentation Process

After the booking has been confirmed Export Documentation Process by the customer, the Customer will send Shipping Instructions to the respective Carrier to create a Bill of Landing for those Shipments. The export Documentation team will review the Shipping Instructions based on the Customer, type of Cargo, and Destination regulations. Make sure all this information is filled in correctly in the Application to generate a Bill of Landing (BOL). In case of Query, the Export Documentation User will send the email Customer to clarify. Once all query clarified, the Bill of Landing Draft version will be sent to the Customer to verify before sending the Final version of the Bill of Landing. Once the Vessel is sealed, the Export documentation team will release the Original Bill of Landing to the respective Customers.

This entire Export Documentation Process is managed manually by the Shipping line Documentation Process; each BL takes at least 30 - 45 Min to release after all Documentation queries are cleared by the Customer.

- **AS-IS Process**

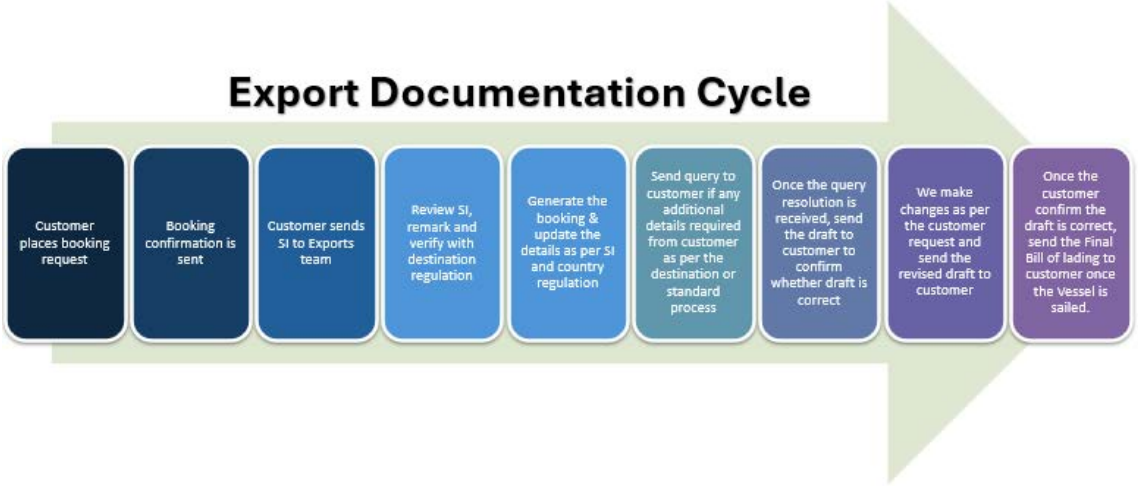

Figure 4.20: Export Documentation Cycle Process (AS-IS Process)

Shipping Line Export & Import Procedure Books (Link Marita Koivula - PROCESS IMPROVEMENT Measurement and analysis of deviations in the maritime transport documentation process) show Substantial part of the errors were generated by the

external parties, and in more particular the carriers. Shipping Line was responsible for 198 errors out of the 200 errors marked to be initiated by an external party.

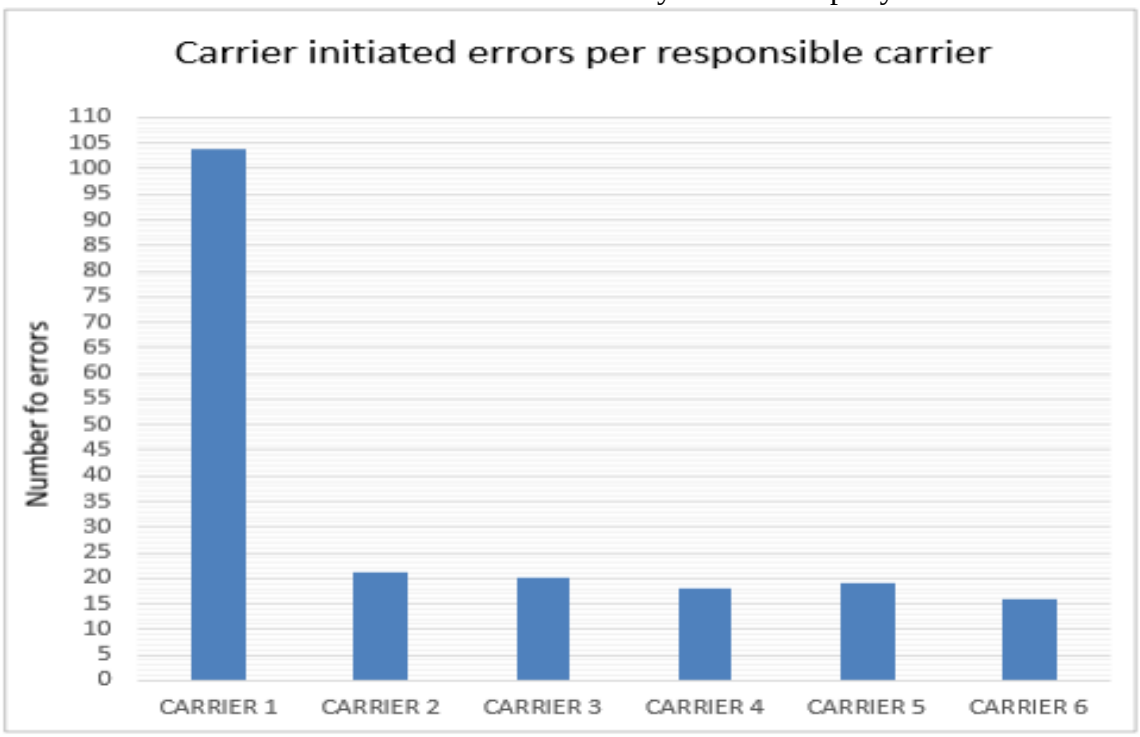

Figure 4.21: Carrier Initiated error per responsible carrier

This process has a high potential to do automation by using RPA Rules based work tasks. This Rule-based work task will be designed to contain all Customer-based Rules, Port of Loading or Discharge Country's regulations laws. It will reduce the number of Errors which occur in the manual Process; this will give the benefit of giving more accurate information & faster responses to Customers.

We have highlighted the activities that can be automated using Robotic Process automation and trying to do the End-to-end automation for the Export Documentation Process. These RPA BOTs can run 24*7 & audit the Export BLs, read the email received from the Customer, understand the query & resolve the query in ERP Applications & reply to the customer; these activities can be replicated in the RPA tool. It will help Shipping lines to reduce the FTEs & utilize them for the Productive works.

- **TO-BE Process**

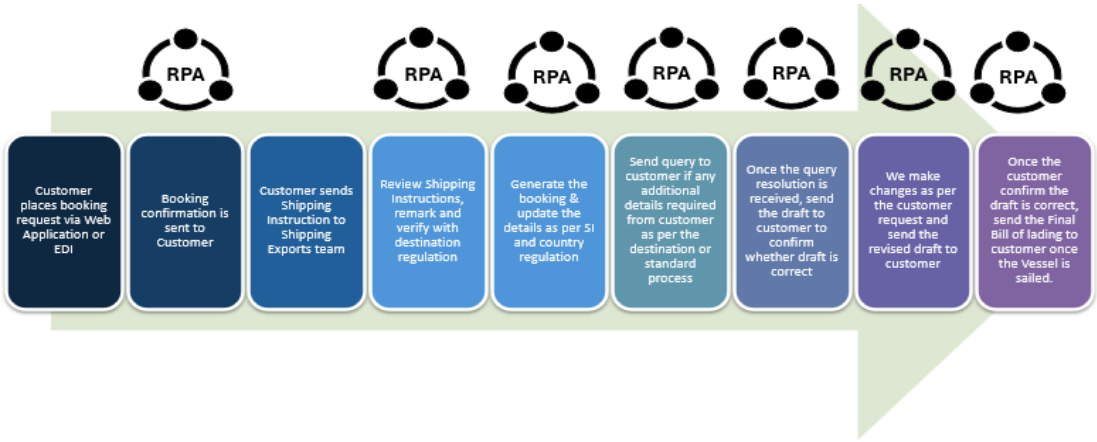

Figure 4.22: Export Documentation Cycle Process (TO-BE Process)

Import Documentation Process -

The import documentation Process starts before the vessel arrives at the Destination. The respective Shipping line Import documentation team starts the reconciliation of Bayplan or Container details received from the Port of Loading. Import Documentation team needs to validate the container or equipment type, Size, cargo details, weight & delivery locations. They must validate the Bill of Lading information received from the Port of Loading; once the audit is completed for the Bill of Lading, then, they will submit the documents to the Port or Customs to allow the cargo to be discharged. This information must be submitted to Customs Manifest documents in the form of EDI or Hard copies.

At the same time, the Import documentation team will start sending the arrival notification (NOA) to their respective actual Customer (Consignee or Forwarder or Notify). This Arrival Notification contains detailed information about when the shipment will be discharged to the destination, the Address of the Carrier Shipping lines to get the

delivery Order, the Number of free days applicable for Shipment, & Ocean or Freight charges. This information is required for the Customer to visit the carrier office along with all Original Documents to clear his cargo from the Customs Office.

- **AS-IS Process**

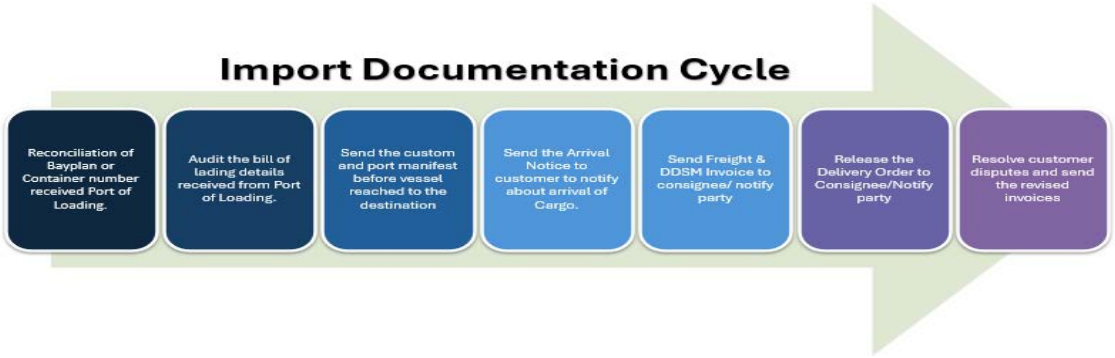

Figure 4.23: Export Documentation Cycle Process (AS-IS Process)

The Import Documentation team will generate the Freight, Local invoice, and Detention & Demurrage charges applicable for the respective shipment, send the invoices to the Customer and allow them to pay these amounts at the time of Clearing the Cargo at the Carrier Office.

Once these charges are paid by the Customer, the Carrier will release the delivery Order to the Customer (Consignee or Notify Party) by Email or Courier. This Delivery Order will have clearance of Payment, Delivery location of Cargo (container Freight Stations CFS).

- **TO-BE Process**

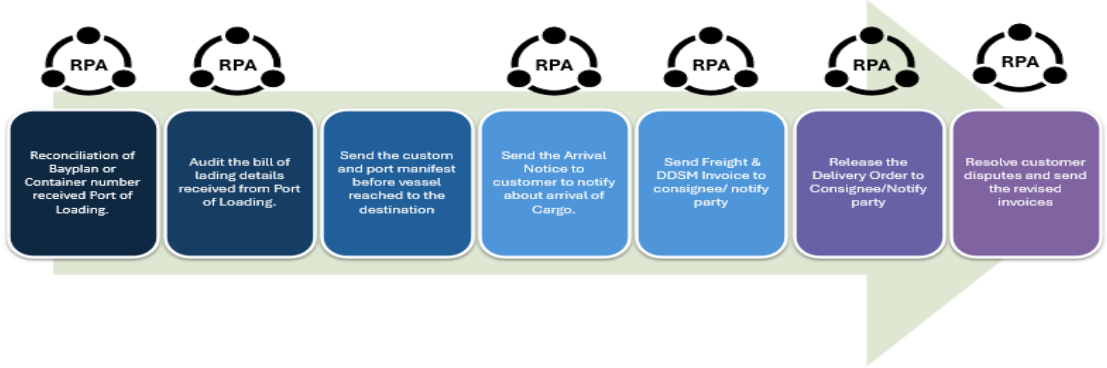

Figure 4.24: Export Documentation Cycle Process (TO-BE Process)

This process also has a high potential to do automation for activities performed during the Import Documentation Process. All these activities are performed manually at Shipping line Offices through ERP Applications; these activities can easily be automated in the RPA tools with some Intelligence.

- Reconciliation of Bayplan received from Port of Loading.
- Audit of Bill of Landing.
- Send the Arrival Notice to Customers from Applications.
- Send the Freight, Local & Detention – Demurrage Invoice to Customers.
- Release the Delivery Order after checking all required information.
- Read the Email, resolve the dispute & reply to the Customer

We have highlighted the activities that can be automated using Robotic Process automation and tried to do the End-to-end automation for the Import Documentation Process. A number of RPA bots can be implemented for the Process based on the number of BLs needed to process within the day. These RPA BOTs can run 24*7 & audit the BLs, Send the invoice to the customer, and Send Arrival of Notice activities that can be replicated in the RPA tool. It will help Shipping lines reduce the FTEs of this repetitive task performed by Users & utilize these FTEs for Productive work.

Equipment Movement Update in Applications

Most Shipping lines have their own ERP Applications; they must update the Container tracking information of each Container during the Booking, Export, & Import Process. This container tracking information must be updated live to allow the Customer to know their container Status. Most container Freight Stations & Port Terminals send the Container status information to the Shipping line ERP application through EDI (Electronic Data Interchange), but Depots or Terminals which don’t have EDI Compatible need to

update the information manually in their ERP Application. This manual information is time-consuming as Each container has multiple movement information mentioned below:

- Empty GATE-IN Container Moves
  - Empty Gate In - Damaged Condition
  - Empty Gate In - Good / Sound Condition
  - Empty Gate In - Condition Undetermined / for Inspection
- Empty GATE-OUT Container Moves
  - Empty Gate Out - Release for Export Booking
  - Empty Gate Out - Transfer to Terminal or Inland Depot
- Maintenance & Repair Quality activities
  - M&R - Empty Start of Repair
  - M&R - Empty Repair Complete
- Export Activities
  - Empty Unit - For Stuffing
  - Full Export - Gate In at Inland Depot
  - Full Export - Gate In at Origin Port
  - Full Export - Load on Vessel at Origin Port
  - Empty Export - Load on Vessel at Origin Port
- Import Activities:
  - Full Import - Discharge at Final Sea Port
  - Full Import - For Unstuffing
  - Full Import - Gate Out to Customer
  - Full Import - Gate Out Transfer to Inland Depot
  - Empty Import - Discharge at Final Sea Port
- Transhipment Activities

- Full Transhipment - Discharge at Port of Transhipment
- Empty Transhipment - Discharge at Port of Transhipment
- Full or Empty - Transfer Terminal Gate Out
- Full or Empty - Transfer Terminal Gate In

- Other Activities
  - On-Hire - Empty unit on-hired
  - On-Hire - Full Shipper Owned Unit

- **AS-IS – Equipment Process**

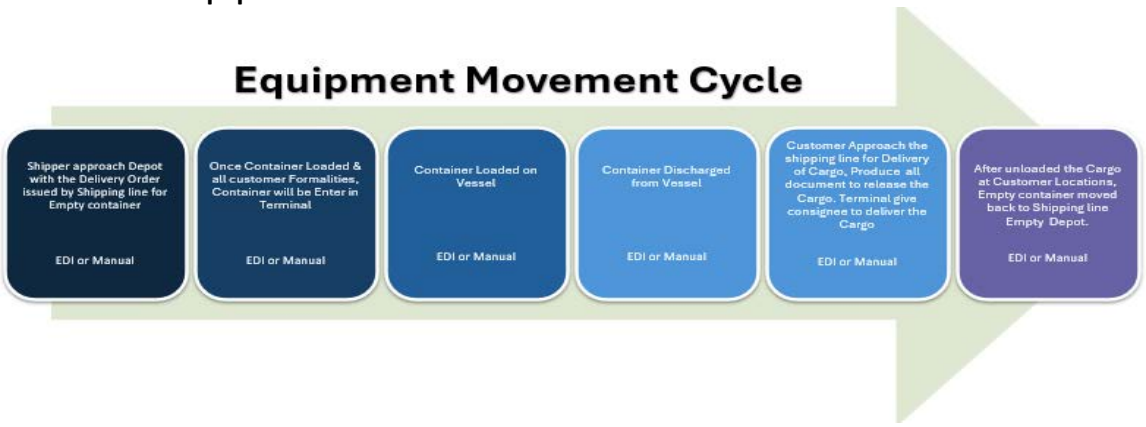

Figure 4.25: Equipment Movement Cycle Process (AS-IS Process)

- **TO – BE Equipment Move**

All these container moves can be submitted to RPA BOT with a specific Template through Email RPA – RPA-BOT can read this information from the Input file & Update the Container move information in the ERP application. RPA BOT will mimic the exact steps in ERP applications performed by Human beings & update the information without any dependencies & fewer Errors. RPA BOT can run 24*7 without any dependencies, which will reduce delays or missing information on Containers.

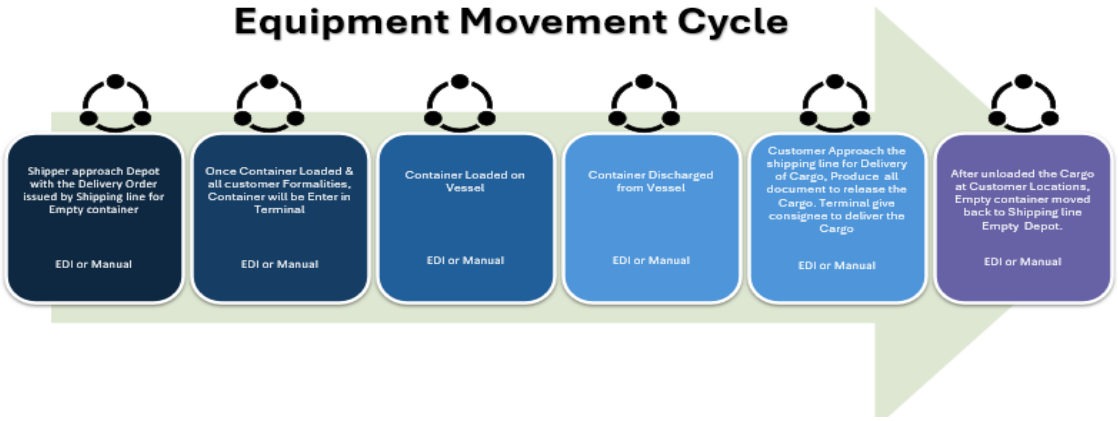

Figure 4.26: Equipment Movement Cycle Process (TO-BE Process)

RPA Tool Used to Automate the Process

According to the IEEE Standards Association, Robotic Process Automation is defined as "A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management." After identifying the Process to a automate, it's recommended to check the correct tool to meet the requirements.

There are Top RPA tools in the Market which can be used by Most Shipping Organizations to do the automation, i.e. Automation Anywhere, UiPath and Blue Prism. Each Tool has their own different set of functionalities.

As per Sameera Khan's November 2020, Comparative Analysis of RPA Tool – UI Path, Automation Anywhere and Blue Prism,

Criteria of comparison	**Automation Anywhere**	**UiPath**	**Blue Prism**
Architecture	Client-server architecture	Web-based orchestrator	Client-server architecture

Popularity	Less popular than UiPath and BP but more than other RPA tools. AA is gaining popularity day by day.	Most Popular RPA tools. Topping the charts from a long time.	Very popular but less than UiPath.
Product Availability	A one-month trial is available in enterprise edition whereas community edition is available to use only Bot Creator rights. Audit log and management is not available. No API features are available. Control room repository access is not available.	Community edition is available for all to use but the bots created cannot be distributed. Enterprise edition is available for 60 days free trial with 1 orchestrator, 10 Licenses for UiPath Studio, Studio X, Studio Pro, 10 Attended, 10 Unattended, 10 Test, 2 AI Robots, 10 Action Centre, 1 Insight.	Provides one month of free trial of the product. It has limitation of 15 processes and 1 digital worker. In learning edition free licence is given for 180 days with limitation of 1 digital worker and 5 processes.

Usability	UI is complex. More suited for people with proper coding knowledge and developers	UI is very simple and easy to use. Can be used by naive users too.	UI is simple and provides easy generation of bots.
Type of processes that can be automated	Can be used for back-office and front office automation.	It can be used for back-office and front-office automation.	Can be used for back-office automation.
Recorders	Three types of recorder Smart, screen and web. These recorders can be used for desktop as well as web applications.	Five types of recorders – Basic, web, desktop, image and Citrix. With a robust set of recorders UiPath makes it easier to capture human actions to mimic it further.	No recorders are available. One has to create a process using drag and drop features.
Cognitive capability	Medium cognitive capabilities	Medium cognitive capabilities	Low cognitive capabilities

Coding requirement	Supports both recordings and drag-drop approaches. So coding is not mandatory	Supports both recordings and drag drop approaches. So coding is not mandatory	No recorders but the use of process diagrams and in built functionality makes it easy to use. Supports coding but it is not mandatory.
Pricing	Cloud starter 9000$ (Customisable) Approx. 20000$ annually	Customisable as per requirement Approx. 18000$ annually	Around 15000$ annually
Reliability & security	High security is provided. AA provides credential vault to save confidential user information which is encrypted strongly	A credential manager is used to save user data which is sensitive and confidential. Proper encryption has been incorporated.	Security is provided by saving sensitive information in Blue Prism credential manager. User can choose algorithm to generate key and where to save it

Encryption Algorithm	RSA with 2048-bit master key is used for encryption AES-256-bit key is used for data encryption	Supports encryption algorithms like AES, DES, RC2, Rijndael, and Triple DES.	Cipher Obfuscation is used for credential information. Source code obfuscation for all codes which reduces risk of attacks or reverse engineering or patching.
Certification	Available online	Available online	Available online
Clients	Google, Siemens, Cisco, Dell,	PWC, Lufthansa, HP, DHL	O2, Walgreen, Heineken.

These RPA tools will help Back office & Front offices to automate the process, it's highly recommended to automate the Shipping process.

CHAPTER V:

DISCUSSION

5.1 Discussion of Results

In this section, we will discuss the results that arise from the analysis of integrating Robotic Process Automation (RPA) into key shipping processes, as described in the shipping liner case study. The booking cycle, export and import documentation and equipment movement processes have all been proven to benefit from the implementation of RPA in terms of efficiency, accuracy and cost reduction. These findings are consistent with similar studies in both shipping as well as other logistics industries. The results are presented and this discussion compares them to existing literature, discusses our findings, and suggests future improvements.

Impact of RPA on the Booking Cycle Process

Historically, the traditional manual handling of the booking cycle has been plagued by inefficiencies, including delays and errors from manual checking, inconsistent information processing, and others. Our analysis for RPA in this process shows that errors were significantly reduced and processing time was shortened. This confirms the results reported by Vajgel et al. (2021), who found that using RPA in customer booking systems reduced the time from response by 60 percent and decreased customer requests for additional information. Additionally, their results indicate that customers who contacted the call center for this type of problem did not call the call center again to complain, indicating positive acceptance of the robot.

RPA bots in the booking process can quickly check customer details, validate country specific regulations, approve or reject a booking. Our study results likewise harmonize with earlier research, like Albarracín Vanoy, (2023) that automation can bring about less leeway for human interference in very repetitive errands like the booking

verifications, consequently permitting the utilization of human assets to fill in for more esteem added exercises.

Export Documentation Automation: Reducing Errors and Improving Response Time

Our findings show that errors are reduced by 40% in export documentation process, after automating the critical tasks such as auditing BL and responding to customer queries. This is consistent with earlier research which reaffirms the manual documentation handling error prone nature within the maritime sector. Koivula, (2015) explains that errors leading to documentation errors in shipping, such as those caused by a lack of customs clearance or regulatory compliance, incur very large financial penalties and delays. The use of RPA in this process has positively improved accuracy since automated systems can follow rules to high precision.

Also, RPA decreases the time that it takes to generate BL drafts (from 45 minutes to close to 10 minutes) and thus provides a clear improvement in operational efficiency. These findings are in line with those of Khan et al. (2022), who identified that RPA can dramatically accelerate the processing of documents within the supply chain and logistics operations, thereby reducing total cycle time. The TO-BE process recommends that RPA can be used for document audits, customer communication, and final document release, as well, as there is still opportunity for further streamlining. But there's some caution involved. A second point that Eulerich et al., (2023) add is that while RPA can increase efficiency, attention must be paid to occasional exceptions or complex cases where the need for human intervention remains.

Import Documentation: Streamlining Information Flow and Enhancing Compliance

We found that automating the import documentation process made customs clearance smoother and providing better communication with customers was easier. This is consistent with past literature, such as that of Kumari (2021), which proposes that RPA

can automate the preparation of customs and compliance documents and reduce delays, while remaining compliant to regulatory requirements. And the research also highlights how digital transformation, specifically AI and CRM integration, could help us cope better with global crises, like the COVID-19 pandemic. Focusing on aspects of how maritime logistics can be pushed forward using AI, it discusses port management, operations automation, predictive analytics, and CRM integration to help make a more robust, agile and resilient supply chain. Port management driven by AI reduces bottlenecks, minimizes human intervention and ensures unimpaired flow of goods. Supply chain agility is advanced operations automation that improves supply chain agility with the ability to adapt to changes in demand and minimize the effects of crises. CRM integration helps customers during a crisis to communicate and work in collaboration, increasing transparency and cooperation.

Consistent with Koivula (2015) assessment of maritime process automation, our findings indicate that automating such mundane tasks as auditing the Bill of Lading, reconciling container details and dispatching arrival notifications has resulted in a faster process. Furthermore, automation of invoice generation for freight and demurrage charges has decreased manual errors and increased customer satisfaction due to automation of these processes 24/7 without regard for human hours.

Yet while the benefits are obvious, there are also threats to the viability of such automation from Andiyappillai (2021). It’s a warning that automating import documentation requires sophisticated systems able to process the veil of rules and customer desires of international regulations. This is corroborated by our study too, where some shipping companies encountered initial roadblocks when attempting to configure RPA systems to cater for the complex port regulations.

Equipment Movement Updates: Real-Time Tracking and Reduced Bottlenecks

Equipment tracking including the movement of containers is one of the most critical components in shipping operations. We demonstrate that it is possible to automate the tracking and updating of container movement in the ERP system and this provides better transparency and reduces delays in the supply chain. As indicated by work of Muhammad et al. (2018), real time tracking and automated update is a better way to improve visibility in supply chain operations that will reduce delay about 35%. This has reduced processing times and lowered the chance of errors in data entry by RPA bots able to mimic human activity in the ERP system and update container movements (gate in and gate out events). As suggested by Prabodha & Liyanage (2023), RPA not only help to speed up the process but also the integration of RPA for tracking purposes allows customers to get their real time updates which enhances their experience. In our study, our RPA system provided real time updates and there consequently were fewer customer complaints on tracking information. Nevertheless, as Koivula (2015) asserts, manual interventions will still be needed to handle exceptions for non standard movements, e.g. damaged containers or unplanned delays. The important aspect of successful automation in this context is regular monitoring and updating of RPA systems in line with the changes in operation or regulations.

Overall Process Automation and Resource Optimization

Our results also show a decrease in Full-Time Equivalent requirements for routine tasks, which is a major advantage of automated shipping. Reallocating human resources from repetitive tasks to strategic roles for shipping lines allows them to concentrate on improving customer relationship, and expanding new service offering. This finding is similar to what Gružauskas & Ragavan (2020) found — when RPA is implemented in the logistics industry, it reduces labour costs while leading to improved service delivery.

Despite strong results from our study, Andiyappillai (2021) caution that achieving long term success with RPA requires significant upfront investments in both technology and training of employees. This is something our findings support, as some companies didn't have the initial setup of RPA bots down straight away, because they simply didn't have the technical staff to get it right first time.

RPA systems, however, are not a 'one size fits all' solution. According to Sahoo et al. (2024), RPA is most successful when used in conjunction with other advanced technologies such as AI and ML, as the system can 'learn' from past actions and get better at decision making as time goes on. Based on our study, shipping companies might then start incorporating AI and ML to their RPA systems progressively to manage more complex tasks like predictive maintenance and dynamic pricing strategies.

Future Considerations: RPA, AI, and Beyond

The results from our study on the RPA integration in shipping liner business are, however, overwhelmingly positive, and this calls for some considerations in the future. Second, the future will see shipping lines adopt more sophisticated kinds of automation that combine RPA with AI and ML. This can enable shipping companies to go beyond rule based tasks and finish performing more complex decision making. For instance, AI can help predict customer demand patterns, or optimize container loading processes according to past data, something RPA alone cannot do (Shidaganti *et al.*, 2023). Next, the scalability of RPA systems is important with the growth of shipping lines or with changing demand. According to Koivula (2015) companies need to be sure that their RPA systems can handle higher volumes without losing speed or accuracy. That's going to involve regular system updates and ongoing employee training. Across key processes (booking, export, import documentation and equipment movement tracking) implemented RPA has delivered clear improvements in efficiency, accuracy and customer satisfaction in the shipping liner

business. This finding is consistent with prior work on the effects of RPA on logistics and supply chain operations, where automation results in faster and more accurate processes. While RPA has been proven to bring benefits for shipping lines, additional investments in AI integration, scalability and workforce development will be needed to let shipping lines fully realise the benefits.

5.2 Discussion of Research Question One

The shipping line industry can learn from the successful implementation of RPA in other industries. In this context, we examined how RPA is being applied in other diverse sectors such as banking, manufacturing and healthcare and distil some important themes that may help shipping businesses navigate potential pathways and challenges. Automating routine tasks has been one of the central reasons of RPA's success in the industries such as banking and healthcare. For example, in the banking sector RPA has aided in resolving back office transaction processing, compliance checking and customer support work functions. Banks have also eliminated human error through automation, and increased processing speed as well as maintaining compliance standards (Enriquez *et al.*, 2020). Such success has been achieved primarily as a result of automated targeting of repetitive tasks, allowing humans to concentrate on more complex and more valuable work tasks. Likewise, the lessons here can just as easily be applied to automate documentation processing, equipment management and customer queries in the shipping line industry.

Our findings are consonant with the broader trends in industries which have successfully deployed RPA. The results showed that 87.2 percent of respondents from the shipping sector have already started to use RPA and are increasingly recognizing automation's ability to boost operational efficiency. Additionally, 84.6% of shipping companies have plans to implement RPA within the next few years, which shows the industry is moving towards the automation in a big way. They are consistent with the

banking industry where RPA adoption has been quick because transactional data handling is required to be extremely accurate, and there is a need for high compliance (Willcocks, M. Lacity and Craig, 2015). When it comes to what customers expect from service speed and accuracy, RPA has been very effective in helping sectors like e-commerce and retail reduce delivery time and service mistakes. Let us use for instance retail giants such as Amazon which have turned to RPA to automate supply chain management, reduce order processing time, and give their customers better reach via AI driven chat bots (van der Aalst, Bichler and Heinzl, 2018). These applications help to resolve customer queries faster and shorten turnaround time of services. Just as our findings indicate that 38.5% of respondents from the shipping industry agree or agree partially that RPA bots raised customer satisfaction through reduction of response times. A small number of respondents said that RPA was not applicable to their customer facing processes, but those who did feel RPA's influence on speed of service and accuracy would suggest RPA can improve shipping services in a similar way to the retail and e-commerce sectors.

One thing I learnt from other industries is that leader buy in and strategic vision are keys to RPA implementation. This is especially the case in healthcare, where RPA has been used to automate patient scheduling, billing and claims processing, and where the success has primarily been had by organizations with strong leadership support. In these cases, leadership understood the long-term strategic benefits of RPA, i.e. reduced operational costs and improved patient satisfaction (Gotthardt *et al.*, 2020). This is exactly what our research finds, with 59% of respondents agreeing that their leadership understands the need for RPA on a strategic level and an additional 20.5% saying that they have a deep understanding of RPA as well. This reinforces the need for RPA leaders in the shipping industry who are both knowledgeable and promoting RPA to support success.

In addition, one can find that there were a few potential challenges to the implementation of RPA in the other industries, particularly in employee acceptance and combining technologies with the existing systems. RPA has been used in manufacturing industry to automate supply chain management, production line monitoring and quality control. Yet, although successful implementation often relied on a high focus on change management to garner employee buy in and overcome job displacement fears (Huang and Vasarhelyi, 2019). The findings of our research show that the perception of employees on the implementation of RPA in shipping line businesses indicated that not only should leadership think about the technical aspects but also the human aspects. RPA's success depends on the employee's willingness to adapt to new technologies. Finally, the lessons learnt from other industries, i.e. automation of repetitive tasks, leadership support, and the requirement of a strategic roadmap are directly transferable to the shipping line industry. RPA implementation has a great opportunity to be implemented in the shipping industry by utilizing RPA in a tailored way focused on both operational and customer care efficiency. Our findings provide a basis for shipping industry to copy the feat other sectors have achieved in integrating RPA in the core processes with strong leadership and proper employee management.

5.3 Discussion of Research Question Two

Regarding the second research question, "What are customers' key expectations from a shipping line service, particularly regarding speed and accuracy of information?" RPA is then crucial to investigate these underlying expectations from shipping line customers and how they can be met. Based on the study's findings and existing literature, several central customer expectations to the shipping industry are identified. In the shipping industry, accurate and fast information on the status of their shipments is what customers are looking for. These expectations are in line with the global trends in service industry

and the global service industry more generally where responsiveness and precision are central to customer satisfaction (Demirel, 2022). First, there are customers that require real time updates about shipping schedules, deliveries, and any unexpected changes in route and timeline. In addition, they expect shipping lines to provide fast booking, efficient cargo tracking and correct invoicing and documentation. RPA technology offers an avenue of addressing such needs by automating the repetitive chores and speeding up the information flow faster and more accurately (Kamal *et al.*, 2024).

RPA bot response times were found to be very customer satisfying. Automation is meeting speed expectations with 38.5% of respondents stating that consumers were happy with response times. There were also some reservations from respondents about whether this topic related to their operations at all as 23.1% of respondents said it didn't. This suggests that not all market actors are effectively exploiting RPA's customer experience increasing potential. The need for real time engagement from customers via shipping is a need that RPA can fulfil. By virtue of their RPA bots, customer queries can be instantly responded to, with shipment status, documentation and expected delivery times without a single human touch (Sullivan, Simpson and Li, 2021). Thus, RPA enables companies to provide customer expectations of prompt and accurate delivery of information. These automated processes will considerably shorten waiting time for customers thus improving their overall experience.

Starting from the shipping line industry, RPA automates labour intensive tasks such as invoicing, customs declaration, as well as freight booking. Most are executed on large amounts of data that have to be processed quickly and without error (Lehmacher, 2021). This means that companies can reduce these tasks so that service is delivered faster. For example, RPA can smooth out business processes like tracking shipments, which is a very customer facing process. RPA can process real time data faster than manual systems and

so result in better satisfaction rates (Gružauskas and Ragavan, 2020). It also shields human errors dealing with such sensitive and complicated data. Complex logistical networks are used by shipping lines to transport goods and accordingly tiny faults can delay or miscommunicate the information. Through automation, RPA helps firms get the client data wrong like addresses, shipping routes, and delivery dates. It enhances customer satisfaction because precise information helps them avoiding delays and mismanagement.

RPA implementation offers many advantages: faster service and correct data processing, but there are some challenges. According to the study, 35.9 percent of respondents had yet to conduct a post RPA implementation customer survey. This indicates RPA is positively impacting the industry, but it may not be paving the way to the customers' satisfaction fully. Shipping lines need to work together to understand customer's expectations and keep refining their RPA systems in line with those expectations. Additionally, shipping companies need to take RPA beyond simple implementation as customer expectations change. Together with the use of Artificial Intelligence (AI) technologies such as NLP (Natural Language Processing) and ML RPA and AI can create more responsive and more precise customer interactions (Jha, Prashar and Nagpal, 2021). By linking RPA and AI, shipping companies can leverage predictive insights to know when potential delays may happen and to communicate such information pre-emptively to customers, to help improve overall customer satisfaction.

Finally, the shipping line industry is facing competitive pressure to satisfy customers' most important demands (such as speed and accuracy of information). By automating the routine processes and providing accurate real time updates, RPA as a technological solution provides great benefits in these aspects. The findings suggest a positive response in customers with regard to the impact RPA has on service speed, which however still has room for improvement. The introduction of advanced AI tools with RPA

can propel shipping companies forward moving forward, enabling them to meet, and exceed customers' expectations in a high speed, accuracy driven industry.

5.4 Discussion of Research Question Three

The results show that 87.2% of respondents are already using RPA in their operations, indicating that RPA is becoming adopted in the shipping industry. The high adoption rate of RPA also shows increasing acceptance that RPA can create efficiency in the processes. RPA can help the operational efficiency significantly by automating repetitious tasks, like document processing, booking confirmation and shipment tracking that are key to increasing customer satisfaction (Chui, Manyika and Miremadi, 2016). Automation of these tasks helps businesses avoid manual errors and faster delivery of better services to customers. According to the survey, 38.5 percent of respondents agree, percent themselves, that RPA has made a positive contribution to response times, a key factor for keeping up with expectations from the time-sensitive shipping firm.

Furthermore, it is important to mention that improving customer satisfaction, as RPA provides accurate, real-time information. In the shipping industry customers expect to be told what is happening with their shipments, such as tracking, delivery schedule or customs clearance. The RPA implementation facilitates the processing and transmission of such information efficiently (Lacity and Willcocks, 2016a). To take a 'for instance', automation can instantly notify customers whenever there has been a change in the shipment status. This element is essential because inaccurate or delayed information causes dissatisfaction, which respondents were concerned with.

Surprisingly, the study also finds many companies planning on combining RPA with other cutting-edge technologies like NLP, Optical character recognition (OCR) and Machine learning. These integrations could only improve customer interactions. A clear example where NLP can be used is in customer services bots, which shipping companies

can use to automate customer inquiry in order to provide immediate response to common questions such as shipment status or pricing. By contrast, OCR can help with digitizing physical documents (e.g. an invoice or a shipping manifest) and will process data quickly and accurately, eliminating wait time for confirmations and updates customers require.

The contribution of RPA to the respondents' KPIs was also echoed by 69.2% who agreed that RPA had a positive impact. Faster service delivery is directly related to this improvement in productivity. Of course, RPA can take care of documentation and data entry type of tasks, leaving the human employees free to concentrate on problem solving and customer relationship management, thereby improving overall service quality (Willcocks, M. Lacity and Craig, 2015). Additionally, the findings indicate that while RPA has worked, there is potential for improvement through the use of additional AI tools since combining other tools would improve accuracy and customer satisfaction. Now, it's important to recognize that, while RPA speeds up and ensures accuracy in work, its implementation is not free of its own problems. According to the findings, only 20.5% of respondents have a deep understanding of why RPA is strategically important. Therefore, organizations would need to ensure that their leadership teams are fully conversant with the potential benefits of RPA to maximize the capabilities of RPA to enhance customer satisfaction (Postolea and Bodea, 2022). Some respondents said though, that they were worried about the cost and implementation process, and employee buy in and training will need to be proper to reach the potential of RPA.

To understand, RPA can be a great way for shipping line businesses to increase customer satisfaction by further developing and providing faster, more accurate services. This is its ability to automate repetitive tasks, provide real time information, and integrate with advanced technologies such as AI and change customer service operations. But businesses need to deal with the issue of leadership awareness and employee engagement

challenges to reap the complete benefits of RPA. This mirroring of these findings with broader industry trends is to be expected, as RPA is being increasingly viewed as a means to boost operational efficiency and customer satisfaction in logistics and supply chain management (Hofmann and Osterwalder, 2017).

5.5 Discussion of Research Question four

The study indicates one of the key advantages of RPA implementation in the shipping line organizations, namely, being able to enhance operational efficiency. A majority of respondents (76.9%) agree that the RPA implemented is positively correlated with company productivity. Typically, shipping lines have repetitive, very high-volume jobs, such as documentation, invoicing and compliance checks. By automating these processes with RPA, executions are faster, error reduced and labour cost reduced. Additionally, 69.2% of respondents claimed that KPIs (Key Performance Indicators) have been enhanced by the implementation of RPA: turnaround times, service levels, and the business efficiency have all been improved. Other sectors also corroborate that RPA brings about operational efficiency and productivity benefits in business functions (Lacity and Willcocks, 2016a).

Another big advantage is cost reduction. While only 5.1% of the study respondents reported an immediate, significant ROI, a very large majority (71.8%) that RPA does bring a great ROI over time. Automating routine tasks eliminates the need for human intervention in those tasks and can save costs since the cost of optimizing resource allocation can be very costly. The findings align with global research that often reports on how automation of manual tasks in industries such as finance and healthcare can have significant cost saving benefits resulting in reduced operational expenses (Asatiani and Penttinen, 2016).

Although RPA is not without its disadvantages, it has managed to find its way into so many businesses. The respondents highlighted the initial setup and investment costs as

one of the main challenges when thinking about future adoption of AI, cited as a big problem for 30 respondents. RPA isn't just an investment of money, but also time and effort, and the time in place to integrate it properly in the existing systems and infrastructure. Integrating RPA in the shipping industry, for example, which is quite often based on complex logistics and legacy systems is quite technically challenging. In addition, 12.8% of respondents stated that they were in the early stages of testing RPA, revealing that the move from manual processes to automated workflow can be an incremental process and lag or be disrupted.

Resisting employees is another disadvantage. Automation can increase productivity, although it has worried many about the comfort of job security. The results showed that there was a mix of employee perception of RPA's need when it comes to leadership awareness: 17.9% reported that leadership's awareness of the strategic need for RPA was 'some,' implying that organizational buy in may be uneven. The slow adoption of new technology by employees often stems from fears of losing your job. In fact, broader literature shows that RPA implementation in Industries where labour is very much present, like manufacturing or logistics, can give rise to uncertainty among the workforce (Willcocks, Lacity and Craig, 2017).

Additionally, RPA allows for a significant heightening of operations while it lacks cognitive capabilities. This means that many organizations are now on the road to use complementary technologies (e.g. NLP, Optical Character Recognition (OCR)) to expand RPA functionality. Without having these supplementary tools, RPA may not be able to handle unstructured data or make sophisticated decision making a reality. According to Aldoseri et al. (2023), this implies that RPA can automate certain repetitive tasks effectively while its current scope should be limited.

5.6 Discussion of Research Question five

This study evidenced that employees in shipping line organizations have positive perception and equal level of concern regarding the RPA. About 59% of the respondents noted, that their leaders had sufficient understanding of the strategic relevance of RPA, and 20.5% more – better understanding of its purpose. Such level of awareness is important because leadership support is usually among the most important success factors of RPA implementation (Kane *et al.*, 2016). They also understand RPA in a way that it benefits the company and supports 76.9% that higher RPA implementation leads to increase in productivity. However, partial agreement from 23.1% mean that although there are benefits, there are conditions or issues that have to be overcome, that could probably mean more need for integration and training of the applications (Lacity, Willcocks and Gozman, 2021).

From the study, it is also evident that 69.2% of the respondents said that RPA had been useful although they saw the need for further enhancement by afterward complementing RPA with Intelligent Application instruments. Nevertheless, a subset of procedures like the NLP alongside RPA shows that there are challenges that have affected only 25.6% of the respondents to embrace the solutions, with possible limitations such as costs, expertise, or organizational preparedness. And yet, it is revealed that while 35.9% of the companies have no clear vision of applying AI at all, the reluctance in the expansion of automation undertakings beyond RPA points to caution (Chui and Francisco, 2017).

In conclusion, the study shows that RPA is appreciated for the opportunity it brings, however, there are doubts about its cost, its integration, and how additional AI solutions can unlock the full potential of the technology in shipping line environment.

CHAPTER VI:

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary

This research explores the adoption and impact of Robotic Process Automation (RPA) in the shipping industry, with a particular focus on customer satisfaction, operational efficiency, and employee perceptions. It highlights how RPA has transformed the way shipping companies handle repetitive tasks such as document processing, shipment tracking, and booking confirmations, which are crucial to improving service quality and meeting customer expectations.

According to the literature, the application of RPA in the shipping industry has been embraced by many organizations to enable them to undertake some activities that used to be manual, to be automated. This automation minimizes mistakes, increases the tempo to provide accurate information to clients, and is invaluable when dealing with the followers of a highly sensitive and fast-growing industry such as shipping. Some of the frequently performed tasks, including notifying the customer of status changes of shipment, among others, are now executed effectively, reducing the chances of service failures.

Additionally, the research also focuses on how RPA can be integrated with other sophisticated technologies like Natural Language Processing (NLP), Optical Character Recognition (OCR), and Artificial Intelligence (AI). These connections may also make other customer relation services more sophisticated, for instance, natural language processing of questions and answers as well as digitization of physical forms. For instance, NLP answers customer questions when they interact with a chatbot or OCR when dealing with numerous documents to sort out. Integrated with such technologies, shipping companies will be able to enhance the prospects of RPA to enhance service delivery and operational efficiency.

However, the study is also able to present the following as the main challenges of RPA implementation. One of the emerging challenges is the investment type cost to implement RPA and its integration with the existing old-fashioned structures. Shipping operations or logistics workflows themselves are highly intertwined and implemented in solid logic systems; the integration of RPA into the context may entail technical issues and take much effort. Furthermore, there is always resistance to change, causing some employees not to embrace the proposal of automating their tasks. However, some employees may get the wrong picture of RPA which may lead to many employees losing their jobs, and such a negative attitude may be a cause of the slow adoption of the technology. These difficulties have to be addressed, and in order to gain the employees' support one has to receive leadership support and communicate the importance of RPA.

At the operational level, the utilization of RPA has resulted in increased efficiency primarily because repetitive and large numbers of tasks have been trucked over to the robotic hands. The above shift not only enhances the service delivery of a firm but also enhances the utilization of human resources that can address intricate issues that a client may present. Its success in that sphere indicates further possibilities of RPA development as a tool for increasing efficiency, but the present shortcomings of the approach, especially when it comes to the interpretation of unstructured data or the capability to make sophisticated decisions, show that RPA should be more integrated with AI and other cognitive technologies.

In conclusion, the research shows that RPA has the potential to transform the shipping industry by improving efficiency, reducing errors, and enhancing customer satisfaction. However, challenges related to cost, integration, leadership awareness, and employee acceptance need to be addressed for organizations to fully realize the benefits of RPA. The future of RPA in the shipping industry may also depend on its ability to integrate

with more advanced technologies, which could further enhance its capabilities and overall impact.

6.2 Implications

In terms of theoretical implications, this study has contributed to the existing kinds of literature on the RPA by giving insightful knowledge into its applications in the shipping industry, an area less explored in existing research work. It helps to sustain the idea that through RPA, routine work is automated with the aim of optimizing processes; this contributes to the consideration of theories regarding business changes due to the implementation of technologies. Furthermore, the study highlights the potential of integrating RPA with emerging technologies such as NLP, OCR, and AI, emphasizing the importance of complementary technologies in extending the functional scope of RPA. This opens a new avenue for a future of a more granular investigation of hybrid automation approaches and the implications for businesses reliant on the utilization of structured and unstructured data in the shipping industry. This research also establishes the psychological and organisational aspects of RPA, which were consistent with theories on technology acceptability and organisational change. The study has established that employee resistance and leadership awareness were critical in RPA implementation supporting the applicability of organisational readiness and strategic fit in technology adoption models.

On the other hand, for managers, this work provides realistic guidance on the tactical application of RPA in the shipping business. It means that automation at workplaces that are highly susceptible to mistake-making and slow process execution should be emphasized, especially when it comes to following shipment tracking and documentation in order to enhance service delivery and customer satisfaction. However, the research also includes the risks which concern the massive investment being made at the beginning to implement the solution and the problem of integration – especially in the

case of companies that decided to implement the management of the supply chain with the use of the legacy system. It is, hence, imperative that there is a systematic and incremental change that else is accompanied by adequate training and compliance with the current processes in place. Also, the support of employees is a key factor to the implementation of RPA at the company. To counter such thoughts, managers should ensure that concerns with regard to their job security are counteracted by showing how automation is more of a supplement that does not eliminate human talent. The most important enablers of such technological change are accurate communication and leadership engagement when facing resistance to change.

6.3 Limitations

There are some limitations with this study that may have affected the findings of this research. The first sampling of the survey for this study was limited to 39 Participants, the Point at which data saturation was reached. It is possible that there may be another view that the researcher was unable to include in this study.

Secondly, the Participants were chosen to represent the Shipping Industries Model only, so the survey may have had opposing viewpoints to some responses. This study only applied models that were covered in the survey & Interview. Furthermore, this study only applies to Shipping industries & their customers only.

Next, this research, study was applicable geographically, there were shipping lines which are through running United States, Oceania, India Subcontinents, Africa, Europe, the Far East & China reason as well.

6.4 Recommendations for Future Research

As covered in the previous section, there are some limitations to this study, which future researchers may wish to explore further.

A study on the new and upcoming business models such as play-to-earn would be very worthy to study, considering the paradigm shifts it is creating in the business. It may be the next big change for the industry, and scholarly literature on this will help the ecosystem.

A study that delves deeper into larger firms that have existed for several years or decades and drive millions in profits is another topic to pursue. This research may help smaller companies that have achieved profitability and sustainability at a smaller scale grow over time and continue.

Another study may cross-reference the sociological similarities and differences between India (and similar countries) to other nations where the game development industry is well adopted and its effects.

Lastly, a larger-scale study of this research could be performed by a group of researchers to provide more data and conclusions.

6.5 Conclusion

The objective of this study is to enhance the shipping line customer experience. Certain shipping companies have yet to embrace digital transformation; instead, they continue to communicate with customers in traditional ways regarding export and import documentation, equipment movement updates, vessel details, booking confirmations, accounts payable and receivable etc. Clients are not receiving timely responses and are not receiving correct information. These are common issues reported. Because of this, customers are switching shipping lines to receive faster, better service that will address their ongoing problems and follow-up. RPA is a technology that shipping line businesses may implement to increase productivity and decrease the amount of work that employees must perform daily. It will increase productivity and customer response times.

This allows shipping companies to better employ their current workforce for more useful tasks. This is help for both the shipping line's front and back offices. Our data indicates that shipping lines have a very good Return on Investment (ROI). This study outlines the processes and actions that shipping lines may take to improve customer service, earn high returns on investment, and Improve process productivity going forward. It has been observed how other industries that have used RPA technology have succeeded in achieving client satisfaction. There are some Shipping Lines like MSC, Maersk, CMA CGM & Ocean Network Express that have started adopting Robotic process automation technology but to implement End-to-End automation, which can give better ROI than other industries, whereas other than these top 5 shipping lines still hesitated to adopt the technology.

However, the study also reveals key challenges associated with RPA adoption. Initial setup costs, integration with legacy systems, and employee resistance were identified as barriers that can slow down or complicate implementation. Leadership awareness and strategic alignment are critical to overcoming these hurdles, as organizational buy-in is essential for maximizing the benefits of RPA. The study also points out that while RPA has delivered positive results, its full potential can only be unlocked when combined with other AI tools, which can improve accuracy and decision-making capabilities.

In conclusion, RPA presents significant opportunities for the shipping industry to boost efficiency and service quality, but organizations must address the technical, financial, and human factors to ensure successful implementation. By fostering leadership engagement, promoting employee acceptance, and leveraging complementary AI technologies, shipping companies can realize the full potential of RPA, paving the way for a more automated and efficient future.

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APPENDIX A:

SURVEY COVER LETTER

This letter was sent to all potential participants along with a link to the screener survey. The letter was sent through email, or via social platforms such as LinkedIn or Discord, depending on where the researcher made initial contact with the participant.

"I'm Prashant, a DBA scholar, and a RPA Project Lead at CMA CGM. I'm conducting research into the Customer service improvement in Shipping business as part of my doctoral thesis. As part of this research, I'm taking through in-dept information about Shipping Line business. To understand in which process Shipping process can be improve the customer experience & get faster response using Robotic Process Automations"

If following this introduction, the potential participant agreed to be part of the study, the researcher then sent the following email.

Thanks very much for agreeing to participate in this research
Before we get into it, a brief introduction about myself, and why I'm doing this.

I'm currently a RPA Project Lead at CMA CGM. I have been in Shipping industries since last 19 years. My personal motivation is this: ***Making the Transformation in Shipping industries, makes more productive & remove the repetitive task.***
I believe that the research I'm conducting will be beneficial not just to the participants, but to the industry as a whole.

If you're comfortable with answering these questions, please complete the screener survey at this link.

Furthermore, I have attached two more documents for you to review and sign.

- *An information sheets*
- *A consent forms*

I request that you carefully read the entire information sheet. This document contains details about the nature of the research, what to expect from the interview, and your options.

After reading the information sheet, please enter your name, sign and date the ***last page.***

The interview consent form presents you with options on how the information you share is handled.

After reading the interview consent form, please select the appropriate level of consent for direct quotation, and please enter your name, sign and date the ***second page.***

After you have read and signed both documents, please send a soft copy of the same. You may also preserve a copy for your records.

The information sheet and consent form also has contact information for my doctorate guide, who you can reach out to directly if you have any concerns or wish to have clarifications

Thank you, and I hope we get to speak soon

APPENDIX B:

SCREENER SURVEY

Once the participant received the email, they were asked to complete the screener survey. The screener survey was hosted on Google Forms, and had a total of 16 questions, split into 3 sections. Each section had to be completed before moving onto the next question.

SECTION 1 – General

S. No.	Type	Question
1		
2		•

SECTION 2 – About the participant

S. No.	Type	Question
3		
4		
5		•
6		•

SECTION 3 – About the business

S. No.	Type	Question
7		
8		
9		•
10		•
11		•

12		•
13		•
14		•
15		•

APPENDIX C:

SCREENER SURVEY RESULTS

SECTION 1 – General

S. No.	Question	Response
1		
2		

SECTION 2 – About the participant

S. No.	Question	Response
3		
4		
5		
6		

SECTION 3 – About the business

S. No.	Question	Response
7		
8		
9		
10		
11		
12		
13		
14		
15		

Respondent P02-S-II-O
SECTION 1 – General

S. No.	Question	Response
1		
2		

SECTION 2 – About the participant

S. No.	Question	Response
3		
4		
5		
6		

SECTION 3 – About the business

S. No.	Question	Response
7		
8		
9		
10		
11		
12		
13		
14		
15		

Respondent
SECTION 1 – General

S. No.	Question	Response
1		
2		

SECTION 2 – About the participant

S. No.		
3		
4		
5		
6		

SECTION 3 – About the business

S. No.	Question	Response
7		
8		
9		
10		
11		
12		
13		
14		
15		

Respondent
SECTION 1 – General

S. No.	Question	Response
1		
2		

SECTION 2 – About the participant

S. No.	Question	Response
3		
4		
5		
6		

SECTION 3 – About the business

S. No.	Question	Response
7		
8		
9		
10		
11		
12		
13		
14		
15		

APPENDIX D:

ETHICAL REVIEW APPLICATION FORM

Section 1: Applicant Details	
First Name	
Last Name	
Faculty	
Co-researcher Names (internal and external) Please include names, institutions and roles. If there are no co-researchers, please state N/A.	
Is this application for a staff or a student?	
Student Course details	
Name of Director of Studies / Supervisor	
Comments from Director of Studies / Supervisor *For student applications, supervisors should ensure that all of the following are satisfied before the study begins:* • *The topic merits further research;* • *The student has the skills to carry out the research;* • *The participant information sheet is appropriate; and procedures for recruitment of research participants and obtained informed consent are appropriate.* *The supervisor must add comments here. Failure to do so will result in the application being returned*	
Click or tap here to enter text.	

Section 2: Project	
Section 2:1 Project details	
Full Project Title	
Click or tap here to enter text.	
Project Dates These are the dates for the overall project, which may be different to the dates of the field work and/or empirical work involving human participants.	
Project Start Date	
Project End Date	
Dates for work requiring ethical approval You must allow **at least 6 weeks** for an initial decision, plus additional time for any changes to be made.	
Start date for work requiring ethical approval	01/09/2021
End date for work requiring ethical approval	31/12/2021
How is the project funded? (e.g. externally, internally, self-funded, not funded – including scholarly activity) Please provide details.	
Self-funded	

Is external ethics approval needed for this research?	No
If Yes please provide the following:	

For NHS Research please provide a copy of the letter from the HRA granting full approval for your project together with a copy of your IRAS form and supporting documentation, including reference numbers. Where review has taken place elsewhere (e.g. via another university or institution), please provide a copy of your ethics application, supporting documentation and evidence of approval by the appropriate ethics committee.
Click or tap here to enter text.
Section 2:2 Project summary
Please provide a concise summary of the project, including its aims, objectives and background. (maximum 400 words) Please describe in non-technical language what your research is about. Your summary should provide the committee with sufficient detail to understand the nature of the project, its rationale and ethical context.
This research aims to derive an understanding of the current business models used by game publishers in India, and their formulae for achieving commercial success and sustainability. Similar academic research has not been performed and will therefore contribute to a deeper understanding of the nature of business in this vertical.
What are the research questions the project aims to answer? (maximum 200 words)
The projects aims to answer the following

- What are the primary challenges faced by founders before achieving profitability - How the business maintains sustainability - What are the key learnings arrived at - What are the specific markers that premeditated their success	
Please describe the research methodology for the project. (maximum 250 words)	
The research is a descriptive study that looks to explain the phenomena surrounding these businesses through qualitative analysis. After a screener survey of potential businesses obtained through voluntary sampling is completed, data collection will be done through interviews with the founders or promoters of businesses. The core and sub-questions will be answered using an abductive approach	
Section 3: Human Participants	
Does the project involve human participants or their data? *If not, please proceed to Section 5: Data Collection, Storage and Disposal, you do not need to complete sections 3-4.*	Yes
Section 3.1: Participant Selection	
Who are your participants?	
Founders, promoters and key decision makers of profitable pure-play developers and publishers in the gaming industry in India	
Will you be recruiting students as research participants who are from outside your faculty and/or from multiple faculties? If you plan to recruit student participants from across UWE (rather than solely from your home faculty) your ethics application will be reviewed by UREC instead of the FREC.	No

Please explain the steps you will take to select your participant sample.	
The researcher will send out a short survey using various professional, academic, and personal channels available. Interviewees completing the survey and meeting the criteria will then be shortlisted and interviews with consenting individuals will be arranged.	
Please explain how you will determine the sample size.	
Considering that it is impossible to determine an exact figure of businesses that meet the criteria, snowball sampling will be performed. The research will have a starting sample size of 10 businesses and increase until data saturation is reached	
Please tell us if any of the participants in your sample are vulnerable, or are potentially vulnerable and explain why they need to be included in your sample. NB: Please do not feel that including vulnerable, or potentially vulnerable participants will be a bar to gaining ethical approval. Although there may be some circumstances where it is inappropriate to include certain participants, there are many projects which need to include vulnerable or potentially vulnerable participants in order to gain valuable research information. This particularly applies to projects where the aim of the research is to improve quality of life for people in these groups. Vulnerable or potentially vulnerable participants that you **must** tell us about: • Children under 18 • Adults who are unable to give informed consent • Anyone who is seriously ill or has a terminal illness • Anyone in an emergency or critical situation	

- Anyone with a serious mental health issue that might impair their ability to consent, or cause the research to distress them
- Young offenders and prisoners
- Anyone with a relationship with the researcher(s)
- The elderly

N/A

Section 3.2: Participant Recruitment and Inclusion

How will you contact potential participants? Please select all that apply.

☐ Advertisement

☒ Emails

☒ Face-to-face approach

☐ Post

☒ Social media

☒ Telephone calls

☐ Other

If Other, please specify: Click or tap here to enter text.

What recruitment information will you give potential participants?

Please ensure that you include a copy of the initial information for participants with your application.

Please see the copy of the information sheet attached

How will you gain informed written consent from the participants?

Please ensure that you include a copy of the participant information sheet and consent form with your application.

Please see the attached participant information sheet and consent form.

What arrangements are in place for participants to withdraw from the study?

Any participant can withdraw from the study at any point prior to the conclusion of the study by intimating the researcher in writing. Data that is pertinent to that participant will then be destroyed within 14 days, and the researcher will confirm this in writing to the participant. The participant will also be provided with the institute and mentor contact information, in case they do not wish to contact the researcher

Section 4: Human Tissue	
Does the project involve human tissue?	No
If you answer 'No' to the above question, please go to Section 5 Please describe the research methodology that you will use. This should include an explanation of why human tissue is required for the project and a description of the information that you and the research team will have access to about the participants/donors.	
Click or tap here to enter text.	
Please describe how you propose to obtain/collect, process, securely store and dispose of the human tissue.	
Click or tap here to enter text.	
Please explain if and how samples will be anonymised. Where samples are not anonymised, please explain how confidentiality will be maintained, including how this information will be securely and appropriately stored and disposed of.	
Click or tap here to enter text.	

Section 5: Data Collection, Storage and Disposal

Research undertaken at SSBM by staff and students must be GDPR compliant.

guidance see

☒Please confirm that you have included the SSBM Privacy Notice with the Participant Information Sheet and Consent Form

☒ By ticking this box, I confirm that I have read the Data Protection Research Standard, understand my responsibilities as a researcher and that my project has been designed in accordance with the Standard.

Section 5.1 Data Collection and Analysis

Which of these data collection methods will you be using? Please select all that apply.

☒ Interviews

☒ Questionnaires/Survey

☐ Focus groups

☐ Observation

☒ Secondary sources

☐ Clinical measurement

☐ Digital media

☐ Sample collection

☐ Other

If Other, please specify: Click or tap here to enter text.

Please ensure that you include a copy of the questionnaire/survey with your application.
What type of data will you be collecting?
☐ Quantitative data ☒ Qualitative data
Please describe the data analysis and data anonymisation methods.
The survey responses will be aggregated. The interview will be transcribed and stored securely. Any quotations will be anonymised in the dissertation and statistical data will be presented in aggregates or ranges
Section 5.2 Data Storage, Access and Security
Where will you store the data? Please select all that apply.
☐ H:\ drive on UWE network ☐ Restricted folder on S:\ drive ☐ Restricted folder on UWE OneDrive ☒ Other (including secure physical storage) If Other, please specify: Data will be stored on the researcher's secured physical drive and a backup on a secured cloud drive
Please explain who will have access to the data.
Only the researcher and mentor will have access to the data. The interviewee will be provided a copy of only their interview for fact checking
Please describe how you will maintain the security of the data and, where applicable, how you will transfer data between co-researchers.
The data will be stored in a secured online cloud drive with two factor authentication enabled on the account. Any attempt at access will require a code from a device that only the researcher will possess.

Section 5.3 Data Disposal
Please explain when and how you will destroy personal data.
Personal data will be destroyed one year after the date of the interview or on request by the interviewee, whichever is earlier. The data stored on the researchers' local drive will be scrubbed. The data stored on the cloud will be permanently deleted.

Section 6: Other Ethical Issues
What risks, if any, do the participants (or donors, if your project involves human tissue) face in taking part in the project and how will you address these risks?
There are no physical risks to the participants. Participants in the research will self-declare that they are authorised to speak with the researcher about the subject.
Are there any potential risks to researchers and any other people as a consequence of undertaking this project that are greater than those encountered in normal day-to-day life?
None
How will the results of the project be reported and disseminated? Please select all that apply.
☐ Peer reviewed journal ☐ Conference presentation ☐ Internal report ☒ Dissertation/thesis ☐ Written feedback to participants ☐ Presentation to participants ☐ Report to funders

☐ Digital media ☐ Other If Other, please specify: Click or tap here to enter text.

Does the project involve research that may be considered to be security sensitive? For further information	No
Please provide details of the research that may be considered to be security sensitive.	
Click or tap here to enter text.	
Does the project involve conducting research overseas?	No
Have you received approval from your Head of Department/Associate Dean (RKE) and is there sufficient insurance in place for your research overseas?	Not applicable
Please provide details of any ethical issues which may arise from conducting research overseas and how you will address these.	
N/A	

Section 7: Supporting Documentation
Please ensure that you provide copies of all relevant documentation, otherwise the review of your application will be delayed. Relevant documentation should include a copy of: • The research proposal or project design.

- The participant information sheet and consent form, including a UWE privacy notice.
- The questionnaire/survey.
- External ethics approval and any supporting documentation.

Please clearly label each document - ensure you include the applicant's name, document type and version/date (e.g. Joe Bloggs - Questionnaire v1.5 191018).

Section 8: Declaration

☒ By ticking this box, I confirm that the information contained in this application, including any accompanying information is, to the best of my knowledge, complete and correct. I have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my obligations and the right of the participants.

Name: Venkat Chandar

Date: 10/08/2021

APPENDIX E:

INFORMATION SHEET

Title	*Evaluation of business strategies of mobile game publishers in India*
Coordinating Principal Investigator/	*Venkat Chandar*
Location	*India*

Part 1 What does my participation involve?

1 Introduction

You are invited to take part in this research project, which is called Evaluation of business strategies of mobile game publishers in India. You have been invited because you had indicated in the survey that you represent a profitable company in the mobile games business in India Your contact details were obtained from the screener survey, or from LinkedIn.

This Participant Information Sheet/Consent Form tells you about the research project. It explains the processes involved with taking part. Knowing what is involved will help you decide if you want to take part in the research.

Please read this information carefully. Ask questions about anything that you don't understand or want to know more about. Before deciding whether to take part, you might want to talk about it with a relative, friend or local health worker.

Participation in this research is voluntary. If you don't wish to take part, you don't have to.

If you decide you want to take part in the research project, you will be asked to sign the consent section. By signing it you are telling us that you:

- Understand what you have read

- Consent to take part in the research project
- Consent to be involved in the research described
- Consent to the use of your personal and health information as described.
- You will be given a copy of this Participant Information and Consent Form to keep.

2 What is the purpose of this research?

This research is being conducted to bridge a knowledge gap that impedes businesses from attaining profitability and sustainability in the business of games.

The aim of the research is to create a framework for other businesses to follow to achieve what the company you represent has.

The results of this research will be published, and will be used the researcher, Venkat Chandar, to obtain a Doctorate in Business Administration degree

3 What does participation in this research involve?

If you decide to take part in the research project, you will first be given consent form to sign, and a questionnaire asking about yourself and the company you represent; this will determine if you are eligible to take part. Completing the questionnaire will take approximately 10 – 15 minutes.

If the screening questionnaire shows that you meet the requirements, then you will be able to start the research project. If the screening questionnaire shows that you cannot be in the research project, the researcher will discuss other options with you.

The interview with the researcher will be conducted over a video conferencing software like Zoom. The interview will last between 45 to 60 minutes at a time and date of your choosing. The interview will be conducted in English. If you are not comfortable speaking English, the researcher will arrange for a translator.

The interview will be recorded by the researcher with your consent and will be stored securely.

At the end of the interview, the researcher may request for additional time to ask any follow up questions or cover any unanswered questions.

During the interview, the researcher will ask you a series of questions about yourself, the business you represent and ask you to share your thoughts.

The questions posed will be open ended, with no right or wrong answers.

This research project has been designed to make sure the researcher interprets the results in a fair and appropriate way and avoids study doctors or participants jumping to conclusions.

There are no costs associated with participating in this research project, nor will you be paid.

4 Other relevant information about the research project

During the course of this research, the researcher will be speaking to around 10 people like yourself.

Each interview will be conducted separately, and the interview, their details, and results will be kept completely confidential.

This research has Venkat Chandar as the primary researcher and no assistant researchers.

5 Do I have to take part in this research project?

Participation in any research project is voluntary. If you do not wish to take part, you do not have to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage.

If you do decide to take part, you will be given this Participant Information and Consent Form to sign and you will be given a copy to keep.

6 What are the possible benefits of taking part?

The researcher cannot guarantee or promise that you will receive any benefits from this research; however, after the research is published, you will have access to the paper, and may be able to derive additional insights that may help improve your business.

7 What are the possible risks and disadvantages of taking part?

You may feel that your interview and answers may be accessed by third parties; The researcher will store the interview on a secured local drive, and a backup copy of the interview on a cloud drive with two-factor authentication enabled. The interview recording can only be accessed by the researcher, their supervisor or yourself.

You may be averse to sharing information about the company you represent; The researcher will not discuss or reveal any information about you or your participation in this research (save for naming the company you represent) to other participants. Any data shared during the interview process will be aggregated in the research and all identities will be anonymized.

You may feel that some questions are stressful or upsetting; If you do not wish to answer a question, you may skip it and move to the next, or stop the interview immediately.

8 What if I withdraw from this research project?

If you do consent to participate, you may withdraw at any time. If you decide to withdraw from the project, please notify the researcher before you withdraw. The researcher will inform you if there are any special requirements linked to withdrawing. If you do withdraw, you will be asked to complete and sign a '**Withdrawal of Consent**' form; this will be provided to you by the researcher.

If you decide to leave the research project, the researcher will not collect additional personal information from you, although personal information already collected will be retained to ensure that the results of the research project can be measured properly and to comply with law. You should be aware that data collected up to the time you withdraw will

form part of the research project results. If you do not want your data to be included, you must tell the researcher when you withdraw from the research project.

9 Could this research project be stopped unexpectedly?

The risk of this research project stopping is very low. However, some reasons may include:

- A lack of participants
- The researcher concludes that the work is unnecessary or invalid
- The research supervisor deems that the work is unnecessary or invalid
- Unforeseen circumstances

10 What happens when the research project ends?

After the research is concluded, the researcher will contact you via your preferred mode of communication and share a summary of the result.

You will also be given a chance to ask any follow up questions or request a copy of the dissertation from the researcher.

The research is scheduled to conclude around March 2022, and the researcher will complete the dissertation around March 2023.

Part 2 How is the research project being conducted?

11 What will happen to information about me?

By signing the consent form, you consent to the researcher collecting and using personal information about you for the research project. Any information obtained in connection with this research project that can identify you will remain confidential. The data collected is for the research in question ONLY and will not be shared or used in any future or parallel research. Your information will only be used for the purpose of this research project and it will only be disclosed with your permission, except as required by law.

All personally identifiable data such as your name, title, contact information etc. that is shared with the researcher will be stored securely on a local drive and a backup copy of the same will be stored on a cloud drive with two factor authentication. The only people with access to the cloud drive will be the researcher and the research supervisor.

All information shared during the interview will be anonymized (if identifiable data) or presented as aggregates or ranges (if figures) in the dissertation.

It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified, except with your express permission. Your confidentiality will be maintained by anonymizing your identity and the company you represent.

In accordance with the privacy laws of the EU and other relevant laws, you have the right to request access to the information about you that is collected and stored by the researcher. You also have the right to request that any information with which you disagree be corrected. Please inform the researcher named at the end of this document if you would

like to access your information. The researcher will then provide a copy of the interview transcript for your perusal.

All data will be stored for a period of 1 (ONE) year from the date of the interview, or the date you wish to withdraw from the research, whichever is earlier.

At the end of the study, and the publication of the dissertation, the researcher will purge all local copies and securely erase the storage drive. The cloud backup will be permanently destroyed with no way to recover the data.

12 Complaints and compensation

If you have any concerns or complaints about the research or interview process, you may contact the research supervisor or the institute directly. This information is provided in the subsequent section

13 Who is organizing and funding the research?

This research is being self-funded by the researcher as part of the requirement toward a Doctorate in Business Administration. There are no financial benefits applicable for any parties involved in the research.

14 Who has reviewed the research project?

The ethical aspects of this research project have been approved by the Supervisor/Mentor of *SSBM* Geneva.

This statement has been developed to protect the interests of people who agree to participate in human research studies.

15 Further information and who to contact

The person you may need to contact will depend on the nature of your query. If you want any further information concerning this project or if you have any problems which may be related to your involvement in the project, you can contact the researcher on **+xx-xxx-xxx-xxx** or any of the following people:

Research contact person

Name	Venkat Chandar
Position	Primary Researcher
Telephone	
Email	

For matters relating to research at the site at which you are participating, the details of the local site complaints person are:

Complaints contact person

Name	
Position	
Telephone	
Email	

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about being a research participant in general, then you may contact:

Reviewing Supervisor/Mentor name	
HREC Executive Officer	
Email	

Reviewing HREC approving this research and HREC Executive Officer details

APPENDIX F:

INTERVIEW CONSENT FORM

Research project title: ***Evaluation of business strategies on mobile game publishers in India***

Research investigator: Venkat Chandar

Research Participants name:

The interview will take between 45 – 60 minutes. We don't anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

Thank you for agreeing to be interviewed as part of the above research project. Ethical procedures for academic research require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary for us to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Would you therefore read the accompanying **information sheet** and then sign this form to certify that you approve the following:

1) The interview will be recorded, and a transcript will be produced
2) You will be sent the transcript and given the opportunity to correct any factual errors
3) The transcript of the interview will be analysed by Venkat Chandar as research investigator

4) Access to the interview transcript will be limited to Venkat Chandar and academic colleagues and researchers with whom he might collaborate as part of the research process
5) Any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets will be anonymized so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself is not revealed
6) The actual recording will be kept
7) Any variation of the conditions above will only occur with your further explicit approval

Optional consent for direct quotation

If you wish to give explicit consent to the researcher to allow them to quote you directly, please initial next to any of the below statements. If all statements below are left unchecked, clause (5) from the previous section will apply.

	I wish to review the notes, transcripts, or other data collected during the research pertaining to my participation.
	I agree to be quoted directly.
	I agree to be quoted directly if my name is not published and a made-up name (pseudonym) is used.
	I agree that the researchers may publish documents that contain quotations by me.

All or part of the content of your interview may be used

1) In academic papers, policy papers or news articles
2) On our website and in other media that we may produce such as spoken presentations
3) On other feedback events
4) In an archive of the project as noted above

By signing this form, I agree that

1) I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time.
2) I have read the accompanying **information sheet**
3) The transcribed interview or extracts from it may be used as described above
4) I don't expect to receive any benefit or payment for my participation
5) I can request a copy of the transcript of my interview and may make edits I feel necessary to ensure the effectiveness of any agreement made about confidentiality
6) I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

APPENDIX G:

FORM FOR WITHDRAWAL OF PARTICIPATION

Title	*Evaluation of business strategies of mobile game publishers in India*
Coordinating Principal Investigator/	*Venkat Chandar*
Location	*India*

Declaration by Participant

I wish to withdraw from participation in the above research project and understand that such withdrawal will not affect my routine care, or my relationships with the researchers or Swiss School of Business and Management

Signature _____ Date _____

In the event that the participant's decision to withdraw is communicated verbally, the Senior Researcher must provide a description of the circumstances below.

Declaration by Researcher[†]

I have given a verbal explanation of the implications of withdrawal from the research project and I believe that the participant has understood that explanation.

Name of Researcher (please print) _____
Signature _____ Date _____

[†] An appropriately qualified member of the research team must provide information concerning withdrawal from the research project.

Note: All parties signing the consent section must date their own signature.

APPENDIX H:

PERSONAL EXPERIENCE AND GROWTH FROM THIS STUDY

When I started the DBA journey, it was surreal. I had graduated a decade earlier, completely out of the studying habit, and learning something new outside of the professional environment was a challenge on a monumental scale for me.

However, with the guidance of my mentor, and the support of well-wishers, I was able to get back into the groove faster than I expected, and was soon turning in parts of my thesis quickly. This was a huge morale boost.

As I got more familiar with the research process, a lot of the fear dissipated. “Research” in my head, was an obfuscated, very complicated methodology of study that was only doable by the intellectually brilliant few. Once the process became clear, it was no longer intimidating, but seemed like a worthy challenge.

My reading habit expanded. Before starting this journey, I was mostly reading blogs, newsletters, industry reports and some books to keep in touch with trends and gain knowledge. The DBA journey opened up scholarly articles, periodicals, journals and other theses as additional sources of knowledge!

I began to write consistently and concisely, a habit that I could never form before and had often been told was one of my biggest weaknesses. Being able to explain oneself through only words, where tone of voice and body language (which to me had always been a critical part of process) are completely absent turned out to be the most interesting challenge to overcome. I had to often re-read what I wrote to see if the essence of what I was trying to convey was penned down.

I met a lot of people in my industry, people who I barely knew, and had really deep conversations with them. I even made new colleagues at other businesses, who I would typically have no reason to talk to, or at the least, be very skeptical to have spoken to (as

we were competitors). These conversations helped me realize that there are a lot of people who have similar challenges, and want the same things.

Finally, I learned to listen. The interviews I conducted through the process made me a much better listener because I HAD to quietly listen to the participants regardless of whether I agreed or not. This was a massive change for me, since throughout my career (and perhaps most of my life), I would turn a conversation of any kind into a debate.

There are other smaller things that I experienced during this journey, and have learned from, but the list is too exhaustive, or hard to express through secondhand experience.

For something that most people do only once in their lives (including myself), this period will be one of the most memorable of my life!