Robotic Process Automation (RPA) and E-Commerce

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Abstract

An e-commerce business runs 24 x 7. In all possibility, it should be running and accepting orders all the time without any glitch. In most scenarios it is not possible to have a completely dedicated team managing the business all the time. Every single e-commerce business requires high level of automation. Robotic Process Automation (RPA) software is used in automating various tasks that are routine based, rule based and time consuming. This research study aims to compare two leading Robotic Process Automation (RPA) tools, Blue Prism and Automation Anywhere, in the context of the e-commerce sector. The purpose of the study is to determine which tool performs better on various parameters, including accuracy, ease of use, scalability, security risks, recorders, and reliability. The research methods involved conducting a Shapiro-Wilk test to assess the normality of data distribution and a Kruskal-Wallis test to identify significant differences between the tools. Additionally, a Mann-Whitney U test was employed to determine the performance superiority of each tool across different parameters. The research findings indicate that Blue Prism demonstrates higher ratings and is perceived as performing better in terms of accuracy, ease of use, scalability, and reliability when compared to Automation Anywhere. However, no significant differences were observed in the ratings for security risks and recorders between the two tools. The applications of RPA in the e-commerce sector were explored, including finance and accounting, customer service, human resources, healthcare, manufacturing, and banking and insurance. Limitations of this study include the reliance on survey data, potential bias in responses, and the focus on only two specific RPA tools. The implications of these findings are substantial for businesses in the e-commerce industry seeking to implement RPA solutions. They can make informed decisions based on the comparative strengths and weaknesses of the tools, aligning their specific requirements with the tool that best suits their needs. It is recommended that organizations initiate pilot projects, establish cross-functional teams, optimize processes, and provide adequate training for successful RPA integration. Future research could explore a broader range of RPA tools and industries to provide a more comprehensive understanding of the RPA landscape.

Keywords: Automation, E-commerce, E-business,RPA, Blue Prism, Automation Anywhere

1. Introduction:

In the dynamic landscape of global commerce, the e-commerce industry has demonstrated an extraordinary trajectory of growth and transformation. With a remarkable ascent from a valuation of $9.09 trillion in 2019 to an astonishing $13 trillion in 2021, the e-commerce sector stands as a testament to the profound impact of technological innovation on business paradigms. Bolstered by this momentum, projections project an even more remarkable evolution, envisioning an unprecedented climb to $55.6 trillion by 2027. This exponential surge, characterized by a projected

compound annual growth rate (CAGR) of 27.4% during 2022-2027, not only underscores the sector's dynamism but also unveils an array of unprecedented opportunities for businesses worldwide.

Amidst this dynamic landscape, the concept of e-commerce workflow automation emerges as a pivotal strategy for capitalizing on the sector's potential. Operating ceaselessly, e-commerce platforms engage in a symphony of activities, from processing transactions and orchestrating marketing campaigns to managing inventory and analyzing consumer behaviour. Yet, the conventional approach of staffing a dedicated team to manage these operations is fraught with challenges – high costs, time-intensive processes, and the inherent potential for human error. The advent of automation, however, ushers in a new era of possibilities, one characterized by efficient, error-free, and seamless e-commerce operations.

A cornerstone of this transformative shift is Robotic Process Automation (RPA), a technological marvel that redefines the contours of business processes. By deploying software robots, often referred to as "bots," RPA streamlines and automates repetitive tasks that underpin a diverse array of business operations. From data entry and extraction to processing, RPA transcends industry boundaries, finding applications across finance, healthcare, manufacturing, and more. At its essence, RPA reimagines tasks previously performed by humans, replicating their actions with precision and efficiency.

Intricately woven into the fabric of e-commerce, RPA promises a spectrum of opportunities. From enhancing customer service and automating marketing endeavours to optimizing inventory management and processing returns, the potential applications are diverse and transformative. The rewards of integrating RPA into these processes are substantial – heightened operational efficiency, amplified productivity, reduced errors, and an enriched customer experience. Furthermore, by relieving human resources from mundane tasks, RPA liberates cognitive capacities, empowering employees to engage in tasks demanding critical thinking, decision-making, and creativity.

Nevertheless, the journey toward harnessing RPA's potential is not devoid of challenges. The imperative of continuous maintenance, the spectre of security vulnerabilities, and the potential displacement of certain job roles necessitate meticulous consideration. As organizations embark on the RPA journey, strategic evaluations of their processes, a balanced assessment of benefits versus risks, and a comprehensive implementation and management strategy become paramount.

In the realm of RPA tools, a trio of industry stalwarts – UiPath, Blue Prism, and Automation Anywhere – dominate the landscape. Tailored to diverse business needs, these tools offer unique features and functionalities that cater to the demands of varying scales and natures of enterprises. While emerging technologies like blockchain and big data analytics have captured academic attention, research explicitly dedicated to RPA remains relatively scarce. According to Kokina and Blanchette (2019), successful adoption of RPA can significantly improve competitiveness by reducing costs and saving time. Despite the growing interest in emerging technologies like blockchain (Kurpjuweit et al., 2021) and big data analytics (Chen et al., 2015; Kache and Seuring, 2017), there is still a shortage of academic research specifically focused on RPA.

As the business world continues its digital metamorphosis, the symbiotic relationship between e-commerce and RPA holds the potential to reshape business dynamics profoundly. Therefore, this research endeavours to bridge the gap by shedding light on the untapped potential of RPA in the e-commerce domain, offering insights into its benefits, challenges, and the strategic considerations required for its successful implementation.

This study aims to conduct an in-depth comparative analysis of two prominent Robotic Process Automation (RPA) tools – Blue Prism and Automation Anywhere. By evaluating their features, capabilities, scalability, ease of use, and integration potential, the research seeks to provide insights

into the distinct advantages and limitations of each tool within the context of e-commerce workflow automation.

The research also aims to explore the extensive spectrum of applications where Robotic Process Automation (RPA) can be harnessed to enhance e-commerce operations. By delving into areas such as customer service, marketing automation, inventory management, order processing, and more, this investigation seeks to uncover the multifaceted opportunities for leveraging RPA's efficiency, accuracy, and round-the-clock functionality in the e-commerce landscape.

2.Literature Review: RPA is the technological imitation of a human worker with the goal of automating structured tasks in a fast and cost-efficient manner (Slaby,2012; Asatiani, A., & Penttinen, E. (2016).).RPA is not a physical robot, it is a software-based solution that is configured to carry out routine operational tasks and procedures that were earlier done by humans . RPA can automate rules-based processes that involve mundane tasks, structured data and outcomes, for example, transferring data from multiple input sources like email and spreadsheets to systems like ERP and CRM systems. RPA is often seen as a key enabler of digital transformation, helping organizations to automate routine tasks and free up employees to focus on higher-value activities. In addition, RPA can be integrated with other emerging technologies such as AI and machine learning to enable even more advanced automation (Deloitte, 2020). It has been conveniently used for confirming the sale of insurance premiums, producing various types of utility bills, paying health care insurance claims, keeping employee records up-to date, among others (Smeets et al., 2021) RPA has been widely used in various industries such as finance and accounting, healthcare, retail, manufacturing, and telecommunications. Some specific applications of RPA include data entry, data processing, customer service, compliance, HR administration, and supply chain management (Osman, 2019).

On the Information Technology (IT) side, one "robot" gives us one software license. In all liability, the robot is integrated across IT systems via front- end, as opposed to traditional software, which communicates with other IT systems via reverse- end. It's convenient   to integrate RPA with nearly any software used by a mortal worker, not worrying much about of its feasibility to third party integration. As per the Institute of Robotic Process robotization (IRPA) RPA technology isn't considered a part of a company's information technology structure, but rather sits on top of it.

Davenport and Kalakota (2019) discussed the potential of artificial intelligence in healthcare and how it can be used to improve patient outcomes and reduce healthcare costs. He also discussed the role of Robotic Process Automation in automating repetitive tasks and freeing up healthcare professionals to focus on more complex tasks.

Depending on the nature and type of business, companies generally use one or further types of robotization to ameliorate effectiveness. When moving from process- driven robotization to further adaptable data- driven robotization, although the form of training data, technology development, structure and moxie will dodge fresh costs, there are implicit benefits in terms fiscal earnings and enhanced scalability. It's also critical to remove the workers' fear of job loss, generally achieved by showing RPA benefits and reframing its perpetration as a way to free workers from tedious tasks and allow them to work on advanced complexity issues rather than as a means to replace them(Marciniak & Stanisławski, 2021)

Three confines impact the relinquishment decision Organizational readiness, Technological readiness and Environmental readiness.

Technological readiness defines an association's capability to establish and use new technological operations (Tornatzky et al., 1990) distinguished between two sub-elements IT structure, to integrate and connect separate systems, and IT mortal coffers, which relate to professed professionals who understand both technological and process aspects(Zhu etal., 2006).

Organizational readiness denotes the directorial and contextual basics to apply new digital technologies While enforcing RAP in an association, change operation and communication are also of great significance

Environmental readiness & Governmental Preparedness Environmental readiness generally comprises suppliers(Kosmol etal., 2019) either, there are government regulations which consists of the legal vittles' associations which they must misbehave with. In discrepancy to other arising technologies, RPA has received little attention from academic exploration experts so far. The crucial issues for RPA executions have traditionally been access and security. Access to coffers has always been managed by humans. still, with software robots, new measures must consider robots ' access to information(Raza etal., 2019)

Ivančić, L et all. (2019) analyzed the opportunities and challenges of Robotic Process Automation in financial services. They discussed how RPA can improve the efficiency of financial processes and reduce errors, but also highlighted potential challenges such as security and data privacy concerns.

Kshetri, N. (2021) explored the potential of blockchain to reduce poverty in the Global South. While not directly related to RPA, the paper discussed how blockchain can be used to automate financial transactions and reduce corruption, which could have implications for the adoption of RPA in financial services.

Flechsig, C., Anslinger, F., & Lasch, R. (2021) provided a comprehensive review of RPA and its future directions. For the implementation of RPA, they pointed out a number of disparities between the commercial and public sectors. They also discussed important directions for organisational practise as well as consequences for the rapidly developing RPA research.

Sarker,S., et all. (2021) provided a review of RPA in healthcare, discussing the potential benefits Haleem (2021) describe how hyper automation allows automation to do virtual tasks performed by business people by merging AI technologies with RPA .

Alfandi (2022) conducted a systematic literature review of RPA and analyszed the quantitative benefits of Robotic Process Automation (RPA). in automating administrative tasks and reducing healthcare costs. The article also highlighted the need for healthcare organizations to carefully consider data privacy concerns and regulatory compliance when implementing RPA.

Costa et al. (2022) argues that there is an avenue for future exploration into uncharted benefits stemming from optimized implementation of RPA . Furthermore, there exists the potential to uncover emerging challenges and vulnerabilities in the evolving RPA landscape.

3. Research Methodology:

3.1 Research Objectives:

1.Comparative analysis of Blue Prism and Automation Anywhere.

2.Evaluating the boarder applications of RPA in e-commerce

3.2 Method:

The research primarily revolves around a survey-based approach. This approach acknowledges the scarcity of relevant literature bridging the emerging RPA technology and the e-commerce sector and seeks to gather valuable insights from individuals with firsthand experience in utilizing both Blue Prism and Automation Anywhere.

3.3 Survey Design:

A meticulously designed questionnaire serves as the central instrument for data collection. This survey is directed towards users who have interacted with both RPA tools within the context of e-commerce.

It probes their experiences, opinions, and observations to draw meaningful conclusions regarding the comparative utilization and applications of these tools. The selection of parameters for comparison was used by a meticulous assessment of the tools' significance within the e-commerce context. Parameters include distinctive features, functionalities, scalability, ease of integration, and user-friendliness. These parameters were chosen to provide a comprehensive overview of the tools' performance in facilitating e-commerce workflow automation. By contrasting these specific attributes, the research aims to uncover the strengths and limitations of each tool, thus aiding businesses in making informed decisions.

3.4 Survey Target Audience and Selection Criteria:

The survey was meticulously designed for individuals who have practical exposure to both Blue Prism and Automation Anywhere within the realm of e-commerce. These participants have intimate familiarity with the tools and their application, ensuring that the collected insights are grounded in real-world experiences.

3.5 Sample Selection and Rationale:

The survey was distributed across five distinct companies within the e-commerce sector. Initially, 60 respondents were approached. However, for data analysis, the focus was narrowed to 32 respondents who had direct exposure to both RPA tools. This careful selection ensures that the insights extracted are representative and pertinent.

3.6 Survey Components:

The questionnaire consists of two main components:

Objective Questions: Eight objective questions are aimed at capturing specific insights regarding participants' interactions with Blue Prism and Automation Anywhere. These questions facilitate quantifiable data collection.

Open-ended Questions: Three open-ended questions encourage participants to provide qualitative input on the applications of RPA tools in the e-commerce sector. These questions allow for the exploration of diverse perspectives and nuanced responses.

Level of Experience (Respondents have used both Blue Prism and Automation Anywhere)	**Total**
Manager	6
Executive/Sr. Executive	26
Total	32

3.7 Rating Scale:

For questions 3 to 8, a Likert Scale ranging from 1 to 5 was employed. Participants were prompted to rate their satisfaction levels with different aspects of the RPA tools based on the provided scale, ranging from "Very Unsatisfied" to "Very Satisfied." Questions 1and 2 were used to collect demographic information such as age and gender at various levels of experience .

Through this survey-based methodology, the research aims to derive insightful conclusions based on the firsthand experiences and perspectives of individuals well-versed in the utilization of Blue Prism

and Automation Anywhere within the e-commerce sector. This focused approach allows for the exploration of the two research objectives and the subsequent analysis of their finding

Table 1. (Compiled by researcher)

Data analysis (Statistical Tools). The data was analysed using Excel and R .

Limitations of the study : Limitations of this study include the reliance on survey data, potential bias in responses, and the focus on only two specific RPA tools. There is huge dependency on articles and Journals from 2017 to 2023.

4. Results & Discussion :

4.1 Descriptive Statistics

4.1.1 Age Group of Respondents :

The distribution of respondents across different age groups reveals noteworthy insights into the participant demographics. Among the respondents, a substantial 72% fall within the age group of 31-40 years, signifying a dominant representation within this bracket. In contrast, 28% of respondents fall within the age group of 21 to 30 years. Interestingly, no participants were recorded in the age group of 41-50 years.

4.1.2 Gender: The breakdown of gender distribution among respondents at various levels of experience namely Executive/Sr Executive and Manger offers insightful observations about the composition of the sample. Within the Manager and Executive levels, 76.67% of respondents identified as male, constituting a significant majority. In contrast, the remaining 23.33% were identified as female. This gender distribution pattern sheds light on the gender representation within the surveyed cohort, indicating a predominantly male participation across the managerial and executive tiers.

4.2 Statistical Analysis

4.2.1 Shapiro-Wilk Test:

A Shapiro-Wilk test was conducted on our dataset to assess the normality of the distribution. This test helps determine whether the data follows a normal distribution. A normal distribution is essential for certain statistical tests that assume data normality, ensuring the validity of their results.

4.2.2 Kruskal-Wallis Test:

Due to the non-normal distribution observed in some parameters, a Kruskal-Wallis test was employed. This test is used to compare more than two independent groups for differences in a non-normally distributed continuous variable. Instead of assuming normal distribution, this test examines if there are statistically significant differences among the groups based on their ranks.

4.2.3 Mann-Whitney Test:

Further analysis involved the Mann-Whitney test, a non-parametric equivalent of the independent samples t-test. This test compares two independent groups to determine if their distributions differ significantly. In our context, it's used to ascertain whether there are significant differences between the two RPA tools with respect to specific parameters.

4.2.4 Shapiro-Wilk test :

Parameter	Test	Blue Prism	Automation Anywhere
Accuracy	Shapiro-Wilk Test	p-value = 0.028, not normal	p-value = 0.001, not normal
Ease of Use	Shapiro-Wilk Test	p-value = 0.352, approximately normal	p-value = 0.004, not normal
Security Risks	Shapiro-Wilk Test	p-value = 0.169, approximately normal	p-value = 0.011, not normal
Scalability	Shapiro-Wilk Test	p-value = 0.269, approximately normal	p-value = 0.017, not normal
Recorders	Shapiro-Wilk Test	p-value = 0.088, approximately normal	p-value = 0.346, approximately normal
Reliability	Shapiro-Wilk Test	p-value = 0.001, not normal	p-value = 0.346, approximately normal

Table 2: Results of Shapiro -Wilk Test

Based on the Shapiro-Wilk test, if the p-value obtained is greater than 0.05, the data can be considered approximately normally distributed. If the p-value is less than or equal to 0.05, the data may not be normally distributed. In summary, the Shapiro-Wilk test indicates that most parameters' data for both Blue Prism and Automation Anywhere are not normally distributed.

4.2.5 Kruskal-Walli's test

Parameter	Chi-squared Value	Degrees of Freedom (df)	p-value	Conclusion
Accuracy	12.3377	1	0.0004438	Significant difference; Blue Prism and Automation Anywhere have distinct perceptions of accuracy
Ease of Use	22.3585	1	2.224e-06	Significant difference; Blue Prism and Automation Anywhere show notable variations in perceived ease of use
Security Risks	0.0085	1	0.9263	No significant difference; Similar perceptions of security risks between Blue Prism and Automation Anywhere

Scalability	11.8726	1	0.0005677	Significant difference; Notable distinction in scalability perceptions between Blue Prism and Automation Anywhere
Recorders	0.0287	1	0.8655	No significant difference; Comparable perceptions of recorders between Blue Prism and Automation Anywhere
Reliability	17.2368	1	3.285e-05	Significant difference: Blue Prism and Automation Anywhere exhibit differing perceptions of reliability

Table 3: Results of Kruskal-Wallis Test

The Kruskal-Wallis test suggests a significant difference in the ratings for reliability between Blue Prism and Automation Anywhere (p-value < 0.05). This indicates that there is a statistically significant difference in the perception of reliability between the two tools.

There are statistically significant differences in the ratings for accuracy, ease of use, scalability, and reliability between Blue Prism and Automation Anywhere. However, there are no significant differences in the ratings for security risks and recorders between the two tools.

These findings suggest that businesses should consider the distinctive performance of Blue Prism and Automation Anywhere with respect to accuracy, ease of use, scalability, and reliability when selecting an RPA tool. The lack of significant differences in security risks and recorders implies that these aspects may not be major differentiating factors.

Ultimately, the determination of the superior RPA tool depends on the specific priorities and requirements of each business. Further assessment using Mann-Whitney's test can provide additional insights into specific comparisons between the two tools.

4.2.6 Mann-Whitney's test

Parameter	Mann-Whitney U Statistic	p-value	Conclusion
Accuracy	84.0	0.0000649	Significant difference
Ease of Use	86.0	0.0000967	Significant difference
Security Risks	103.0	0.375	Nosignificant difference
Scalability	83.0	0.0000524	Significant difference
Recorders	115.0	0.522	No significant difference
Reliability	92.0	0.000398	Significant difference

Table 4: Mann Whitney Test Results

The Mann-Whitney test results provide a concise overview of the statistical comparisons between Blue Prism and Automation Anywhere for each parameter. The p-values indicate the significance of the differences observed. Based on these results:

There are significant differences in the ratings for accuracy, ease of use, scalability, and reliability between Blue Prism and Automation Anywhere. No significant differences were found in the ratings for security risks and recorders between the two tools. These findings reaffirm the conclusions drawn from the Kruskal-Wallis tests. They emphasize the importance of accuracy, ease of use, scalability, and reliability as differentiating factors when comparing Blue Prism and Automation Anywhere. The lack of significant differences in security risks and recorders suggests that these aspects may not strongly influence the choice between the two tools.

4.3   Applications of RPA in E-Commerce

Robotic Process Automation (RPA) tools like Blue Prism and Automation Anywhere are widely used in many different industries and applications to automate repetitive, rule-based tasks. Based on the responses to three open ended questions ,the responses are categorised in themes below:

- Finance and Accounting: RPA tools can be used to automate tasks such as data entry, reconciliations, and reporting in finance and accounting departments.
- Customer Service: RPA tools can help automate tasks such as responding to customer inquiries, routing tickets, and processing refunds.
- Human Resources: RPA tools can be used to automate tasks such as employee onboarding, payroll processing, and benefits administration.
- Healthcare: RPA tools can be used to automate tasks such as appointment scheduling, patient data entry, and claims processing.
- Manufacturing: RPA tools can help automate tasks such as quality control, inventory management, and order processing in manufacturing industries.
- Banking and Insurance: RPA tools can be used to automate tasks such as loan processing, insurance claims processing, and compliance reporting in the banking and insurance industries.

The comparative analysis validates the potential of RPA tools by showcasing their real-world performance differences, aiding businesses in making informed decisions. Simultaneously, the broader applications emphasize RPA's relevance and effectiveness in addressing diverse e-commerce challenges.

5. Conclusion

The advantages and uses of RPA appear to be much more lucrative in reality. The eCommerce sector is seeing a third wave of success. Utilizing innovative technology like RPA can be quite beneficial for the company. The harsh fact of today's industry is disruption, which forces companies to constantly alter their methods of operation. The time has come for all small- and medium-sized eCommerce firms to compete directly with major competitors on the global stage by implementing low-cost yet powerful methods. Two of the top RPA tools on the market are Blue Prism and Automation Anywhere. Nevertheless, even after weighing their interfaces, scalability, and automation possibilities, it could be challenging to pick between the two .If a firm requires a long-term, scalable solution and can afford a greater upfront cost with strong security in place, Blue Prism might be a better option. Blue Prism tends to perform better in terms of accuracy, ease of use, scalability, and reliability compared to Automation Anywhere. However, it's important to consider other factors such as specific requirements, implementation ease, cost, support, and additional features when choosing the most suitable RPA tool for a particular use case.

6. Recommendations:

The organizations should begin with a pilot project or a smaller set of processes to test and validate the effectiveness of RPA in their e-commerce environment. This allows them to learn from initial implementation, make adjustments, and gain confidence before scaling up to automate more processes. stablish a cross-functional team involving business users, IT personnel, process owners, and RPA experts. Collaborative involvement ensures a comprehensive understanding of business requirements, technical feasibility, and smooth implementation. Encourage open communication and knowledge sharing among team members. Before implementing RPA, optimize and standardization of processes should happen as much as possible. Streamlining processes beforehand maximizes the benefits of automation and minimizes potential complications. Providing training to employees who will work with RPA tools and bots and offering hands-on sessions, workshops, and documentation to ensure they understand the technology, its capabilities, and their roles in managing automated processes is crucial.

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