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APPLICATIONS OF ROBOTIC PROCESS AUTOMATION IN FINANCE AND ACCOUNTING

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ABSTRACT

Processes that contain repetitive and well-defined steps are more suitable for robotic process automation (RPA) than others. Many financial processes such as quarterly reports and balance sheet preparation fall into this category. Also, these processes are voluminous, making the benefits of RPA even more recognizable. Financial institutions (FIs) become aware of the benefits of RPA earlier than others and adopted RPA in many of their applications. Account reconciliations, reporting, and tax planning are among the processes that have been adapted to RPA. RPA has been a popular term in the industry for the last few years, only recently has it started to become a technology that's within the reach of most organizations. RPA market has been almost doubling every year and it is expected to grow by more than 50 through 2020. Growth in the Turkish market is also substantial: between 2018 and 2020 more than 130 top companies have employed RPA robots in their infrastructure. Banks and technology companies in Turkey adapt RPA faster than other sectors, about 50% of the companies that adapted RPA are from these sectors. This paper discusses applications and advantages of RPA by giving examples from the finance and accounting in Turkey.

Keywords: *Finance; automation technologies, RPA, financial applications, financial automation*

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FİNANS VE MUHASEBEDE ROBOTİK SÜREÇ OTOMASYONUNUN UYGULAMALARI

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ÖZ

Tekrarlı ve iyi tanımlı adımlar içeren süreçler robotik süreç otomasyonu (RPA) için diğer süreçlere göre daha uygundurlar. Finans alanında çeyrek sonu raporları ve bilanço tablosu oluşturma gibi kurallı ve düzenli çalışan süreçler bunlara iyi birer örnektir. Ayrıca bu tür süreçler yüksek hacimleri sayesinde RPA'nın katkısını daha da görünür hale getirirler. Finansal kuruluşlar RPA'nın katkı ve kazancını diğerler sektör kuruluşlarından önce farketmiş ve RPA'yı birçok uygulamalarına uyarlamışlardır. Bunların başında raporlama, mutabakat, vergi hesaplama gibi süreçler gelmektedir. RPA, son birkaç yıldır sektörde popüler bir anahtar kelime olmuştur, ancak son zamanlarda çoğu kuruluşun erişebileceği bir teknoloji haline de gelmeyi başarmıştır. Hackett Group tarafından hazırlanan bir raporda RPA, küresel iş hizmetleri kuruluşlarında ve tüm iş süreci dış kaynak kullanımı (BPO) ekosisteminde ezber bozan bir unsur olarak gösterilmektedir. RPA pazarı her yıl neredeyse ikiye katlanmakta ve 2020'ye kadar %50'den fazla büyümesi beklenmektedir. Türkiye pazarındaki büyüme hızı da oldukça etkileyicidir: 2018-2020 yılları arasında Türkiye'nin önde gelen 130 şirketi RPA robotlarını kendi bünyelerine kattılar. Bankalar ve teknoloji firmaları RPA adaptasyonu konusunda daha hızlı davrandılar, ülkedeki RPA robotlarının yaklaşık %50'si bu iki sektör tarafından kullanılmaktadır; sadece bankalar robotların %30'dan fazlasına sahiptirler. Bu makale, Türkiye'den örnekler vererek finans alanında RPA'nın uygulamalarını ve avantajlarını tartışmaktadır.

Anahtar Kelimeler: *Finans; otomasyon teknolojileri; RPA; finansal uygulamalar; finansal otomasyon*

I. INTRODUCTION

Financial institutions (FIs) typically execute hundreds of thousands of financial transactions, and manually processes numerous documents on a daily basis. Customer on-boarding, know your customer (KYC), risk mitigation, money transfers are among the processes that require extensive amount of data and manual work. (Parcells, 2016) Also once onboarded, customers require constant interaction through call centers, chatbots, emails etc., requiring similar amount of labor-intensive processes. When added up, these core processes lock up considerable amount of key employee time regularly, and also very susceptible to human errors.

Robotics process automation (RPA), is a type of regulatory technology (RegTech) that provides FIs an effective alternative to burning up employee time and effort in mundane and tiring tasks. (Ortega, 2018) Bots, the "workforce" of RPA, are software programs that follow defined internal business rules and policies and can be trained on essentially any repeatable and rule-based process. By training bots to follow standardized processes, FIs can improve efficiency, increase throughput, and reduce errors. This paper discusses how RPA has been utilized by FIs and provides a number of example processes from the finance and accounting sector.

II. COMMON FINANCIAL USAGES FOR RPA

The most common use for bots in the finance domain is to replicate financial information (e.g. customer details, market values, credit ratings etc.) across multiple internal systems and make them available across business units. RPA bots have been utilized by FIs for this purpose as early as 2017. (Chakroborty, 2017) In a 2017 study, E&Y lists the potential application areas of RPA in the finance function as follows:

- Bank reconciliation process
- Financial and external reporting
- Sales ordering and invoicing
- Inventory management
- Receivables and payables management
- Fixed asset management
- Tax planning and accounting

This list coincides with the applications of RPA that had been listed in other studies (Top 10 Use Cases for Automation in Finance, 2019) (Sarno, 2018). Especially, reconciliation, reporting and account payables are the most commonly listed application areas. The heatmap below shows the rates of occurrences of these applications in several subdomains of the financial applications. (Kumar, 2019) The blue highlighted sections show the financial applications where RPA has been most commonly used. Grey highlights show the secondary targets for RPA applications in the finance domain.

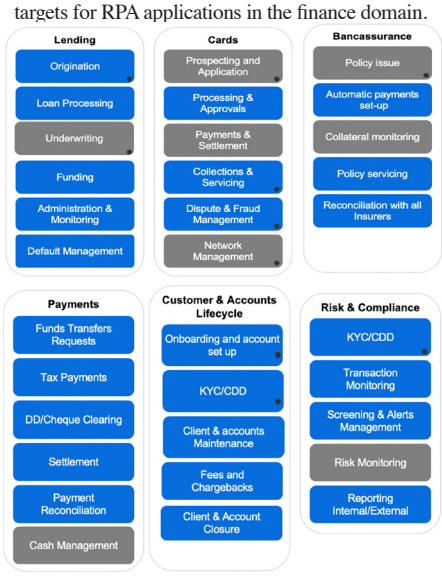

Figure 1. RPA Heatmap for Financial Applications

Monitoring and screening is another common application area for the RPA bots in FIs. Bots have been used for 24/7 surveillance at applications systems and networks, generate alerts based on learnt or supervised heuristics. These alerts are further tailored towards FI's needs, to escalate potential issues based on the given risk tolerance. Also, bots are configured to escalate issues to human operators in the case of unexpected behavior. In this scenario, bots can work in tandem with humans, handing over the processes to each other, as needed. Robots capture the operator's actions and decisions and continue automation until the next decision point.

Another common practice for bot use is employee onboarding and offboarding from HR department. Both processes are very rule-based (i.e. doesn't variate much between employees) and very repetitive (have to be done hundreds to thousands of times every day based on FIs size). Bots not only execute these processes with much greater speed and accuracy, but also provide much better-quality standards by ensuring that every employee follows the same standard process without the risk of human error or deviation.

Enforcement actions are another pain point for FIs, as by design, they require FIs to complete work either deemed incorrect or insufficient by regulators; and this work generally have to be done manually. Instead of spending considerable time and effort to train internal teams or hiring external experts, the FIs have been utilizing RPA to handle mundane enforcement actions.

One key benefit of RPA is the ability to consolidate knowledge on business processes from various departments and business units, into a small number of bots. RPA robots can execute and deliver any business process as long as they are rule-based the bot can access the necessary systems. This benefit reduces the length of the learning curve and reduce the time to be spent to train the employees. Instead of than relying on dozens or hundreds of individuals to each gain the necessary domain and systems knowledge, RPA bots are only dependent on a small group of RPA developers to convert business rules into RPA language.

On the other hand, there is a number of barriers against adapting RPA by FIs. (Juntunen, 2018)

• **Reduced costs:** Labor costs have both adverse and positive effects on introduction of RPA in FIs. Over the last decade, in emerging economies the cost of labor has increased about 10-15% on average due to reduced labor availability. Also, in China average cost of industrial robots has declined more than 29% since early 2000s. This means that in emerging markets that are experiencing labor shortage, RPA is becoming an increasingly attractive to reduce dependency in workforce. And FIs are deeply affected by this change.

• **Competitive advantage:** Global companies have been utilizing RPA to streamline activities and drive positive business outcomes. With RPA, these companies reduce the life-time of transactions, so that more activities can be executed more efficiently and quickly in order to keep up with the volume. Despite lower labor costs available in the emerging markets, companies in those countries have to employ RPA to be able to compete with the global companies.

• **Increased capabilities:** Rather than automating merely simple and easy tasks, RPA offers automation of more sophisticated activities within various industries, from healthcare to finance to manufacturing to automotive., RPA has been successfully utilized in complex tasks such as order processing, fraud detection, regulatory compliance, data migration, and marketing. (Kokina & Blanchette, 2019)

For most FIs, the need for utilizing RPA is no longer a question; they focus on increasing ROIs and RPA awareness across their employees Those that ignore or delay integration with RPA risk losing their competitive positioning, while those that embrace the efficiency and cost-savings of these technologies will position themselves for long term competitiveness.

III. WHEN DOES RPA MAKE SENSE?

In their 2019 research report, the Hackett Group showed that the market for RPA has been still growing with a high pace. (Essaides, 2019) In the report, RPA is shown as the game changer in the global business services organizations and the entire business process outsourcing (BPO) ecosystem. RPA market has been almost doubling every year and it is expected to grow by 50%+ through 2020. (Kokina & Blanchette, 2019)

RPA allows companies to achieve remarkable cost savings without having to change their existing technology infrastructure and process design. In organizations' IT systems, RPA is placed between other applications and websites and does repetitive, rule-based work that would typically be done by the employees. RPA can mimic human interfaces and operate computer systems just like an employee would. It brings the biggest benefit to companies that have a fragmented technology landscape with multiple applications or instances of an ERP. Two big factors are driving RPA adoption in finance and elsewhere are:

• **Short ROI (Return on Investment):** RPA projects have short development cycles and provide quick returns such as FTE reduction and increase compliance, based on low initial investment with a high ROI in weeks and months, instead of years.

• **Increased Reliability:** RPA-enabled processes are highly auditable, have very low error rates, very scalable and provide the reporting to end users for sophisticated analytics. (Marcey, 2019)

RPA has been a popular term in the industry for the last few years, only recently has it started to become a technology that's within reach of most organizations. RPA provides opportunities to increase the efficiency of the processes without going through a complete transformation. Smaller organizations that can move quickly prefer RPA for increased agility and fast ROI in developing advanced technology that greatly increase customer experience through modernized interfaces. On the other hand, large companies have advantages in their existing market share, and already established processes, however they also need to change to modernize their approach due to high competition in the area.

A) EXAMPLE USE CASE FROM FINANCE

Most finance processes are particularly suitable for RPA, such as the order-to-cash process. In that process, customer billing occupies an important task; and it also meets the criteria listed below.

- High frequency and high volume
- Rule-based
- Structured
- Prone to human error
- Limited exceptions and human intervention needed

In the customer billing task, robots can read the general invoice through OCR. Next, it consolidates the information that is required for billing. Robot next logs into an ERP application where the billing details are saved and sent for internal approval. Finally, it puts together all information together in the right format to send the final invoice to the customer. This entire process can be automated without any human intervention; and it usually has very high volumes.

B) TURKISH MARKET

Although RPA has been used in the Turkish market since 2016, it has seen significant growth after 2019. (Dogan, 2020) UiPath, Blue Prism and Automation Anywhere have been the most popular RPA vendors that are in use in the Turkish market. This study examines the usage of RPA robots in the top 130 companies in Turkey, and focuses on the applications of RPA in finance and accounting in those companies. For this study, a survey was conducted among these companies in Turkey to collect information about their RPA usages. The RPA teams from these companies were asked to answer a few questions regarding their RPA usages. The list of questions in the survey is provided in the Appendix. Table 1 shows the distribution of the companies between industries and the total number of robots that are being used in each industry.

Table 1. Distribution of RPA robots in Turkey among industries

	Number of Companies	Number of RPA Robots
Banking	16	187
Insurance	13	56
FMCG	7	89
Technology Services	19	82
Electronics	8	56
Automotive	9	52
Other	58	77

Table 1 shows that companies in the technology services (software, hardware and consulting) and banking sectors invest more in RPA robots than others, and they utilize more than 40% of the RPA robots in Turkey. These sectors employ high-volume and repetitive processes such as financial reporting and customer onboarding, which utilize the RPA robots in significant amounts. Figure 2 shows distribution of the RPA robots between industries.

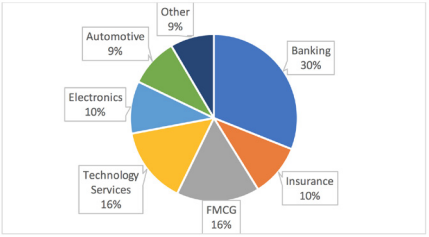

Figure 2. Distribution of RPA robots in Turkey among different industries

Finance and accounting have been the most popular areas for RPA in the Turkish market as well – more than 30% of the RPA processes are implemented in finance and accounting. Figure 3 shows distribution of RPA processes by departments among the top 100 companies in Turkey.

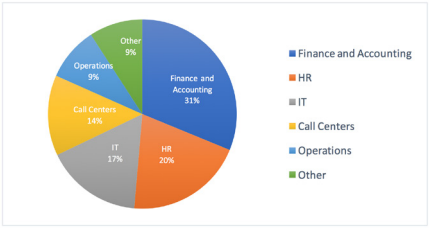

Figure 3. Distribution of RPA processes per department

Within finance and accounting, some of the common processes are more suitable for RPA than others, due to their characteristics, such as simplicity and frequency. (Fernandez & Aman, 2018) For example, worksheet reconciliation is a very rule-based process, while being very susceptible to human errors. It is also done quite often, so companies move worksheet reconciliation to RPA to reduce errors and save considerable amount of employee time. Table 2 below shows the finance and accounting processes that are commonly done by the RPA robots in Turkey.

Table 2. Common finance and accounting processes used in RPA

• Worksheet reconciliation	• Preparing and entering the correction records
• Sub-account reconciliation	• Accrual calculations
• Bank reconciliations	• Realization of group reconciliations
• Suspicious credit data reconciliation	• Validation of intragroup expenses
• Collection agreements	• Creating financial statements
• Customer reconciliations	• Preparation of correct and consistent data base for reporting from GL accounts
• e-Invoice ERP reconciliation	• Performing variance analysis
• Scorecard operations	• Systematic workflow management
• Stakeholder notifications for unresolved differences	

As can be seen in Table 2, the majority of the finance and accounting processes that are done by the RPA robots are about reconciliations and payments. Other topics include *collections, payments* and *invoices*. Figure 4 shows the distribution of RPA processes in finance and accounting.

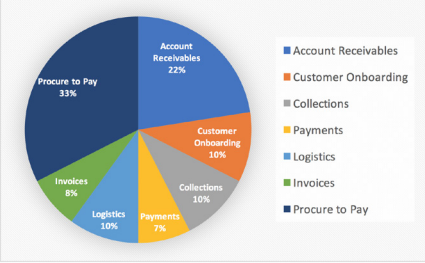

Figure 4. Distribution of RPA processes in finance and accounting

Figure 4 uses the number of the processes and doesn't consider their frequencies and volumes of the processes. However, two of the important metrics in RPA usage are *robot utilization* and *FTE savings*. (Dey & Das, 2019) Robot utilization is calculated based on the average number of hours that an RPA robot run processes in a 24-hour period. RPA robots do not use weekends, PTOs or bank holidays, thus yearly utilizations are generally calculated over 365 days. So, the robot utilization can be formulated as

*Total number of yearly hours that a robot is busy / (24 * 365)*

FTE savings is the metric that is used for estimating the return on investment (ROI). While RPA robots do not necessarily replace human employees directly, they are expected to offload work from them. The total amount of work that is offloaded from the employees is formulated in terms of FTE savings. For example, if the worksheet reconciliation process takes 2 hours of one employee per day and it is done by 5 employees, having it done by the RPA robots will offload 10 hours of work from the employees every day. Considering the 8-hour work shifts of employees, it can be said that the company saved 1.25 FTEs by having the worksheet reconciliation done by the RPA robots instead of the employees. The time freed up from the employees can be used for assigning them more complex tasks or providing them with in-job trainings.

Robot utilization and FTE savings metrics provide managers insights about their RPA investments from various angles. The process that utilizes (occupies) the RPA robots the most doesn't necessarily be the one that also provides the most FTE savings; and the reverse is also true. For example, preparing financial reports and statements is a very tedious and long process when done manually. They are usually done by a team of employees on a regular basis. On average, employees spend 2-3 days on this process every month; so, for a team of 5 employees it consumes 10-15 days per month (roughly 0.5 FTE). However, the same process takes only a few minutes every month when executed by the RPA robots. In this case, the robot utilization is so small that it can be ignored.

Figure 5 shows the metric distribution of finance and accounting processes in the Turkish market. Processes in account receivables offer considerable FTE savings with small robot utilizations. This allows companies to use the RPA robots for more processes, further increasing the total FTEs saved.

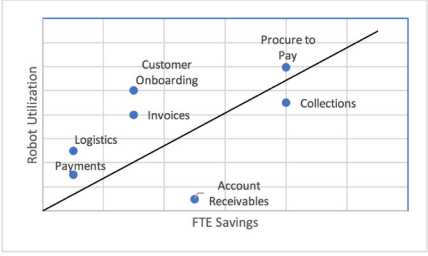

Figure 5. Metric distribution of finance and accounting processes

IV. CONCLUSION

Although the RPA term has been commonly used in the last decade or so, it is still in early adoption phase. However, it's showing with great promise in the finance area. It's a quick and high ROI approach to resolving issues like inflated process cost, high error rates, slow processing times, etc. It also offers longer-term automation solutions to specific process improvement that does not require a complete overhaul of existing process or system architecture.

RPA market in Turkey has been booming since 2018, with banks and technology companies adapting the RPA technology faster than others. Turkish banks own 30% of the RPA robots in the market, and finance and accounting have been the most popular areas – more than 30% of the RPA processes are implemented in finance and accounting. The majority of the common finance and accounting processes are on reconciliations and payments. Other common topics include c*ollections, payments and invoices*.

Managers use *robot utilization and FTE savings* as metrics for RPA usage. These metrics provide them with insights about their RPA investments from different angles. While RPA has been utilized to mimic employee actions, recent progress in data mining and machine learning areas offer new skills for the RPA robots. Hyperautomation – a term introduced by Gartner in 2020 – offers various abilities such as process discovery, planning and measurement together for future robots. RPA robots will be expected to discover processes through data mining and measure their characteristics before actually executing them. Future robots will have ability to learn from data models, generate rules from big data and take autonomous actions without human intervention.

V. APPENDIX

RPA usage survey questions:
1. Company Name
2. Company Industry
3. Number of RPA robots
4. Number of processes run by robots – per division
5. Monthly average robot usage (hours)
6. Monthly average FTE savings

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