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SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

THE PILOT IMPLEMENTATION OF ROBOTIC PROCESS AUTOMATION IN HUMAN RESOURCE DEPARTMENT

Ljubljana, August 2021   BOJAN TOMŠIČ

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LIST OF ABBREVIATIONS

AI – Artificial Intelligence
CoE – Centre of Excellence
CRM – Customer Relationship Management
DGFF – DHL Global Forwarding, Freight
ERP – Enterprise Resource Planning
FTE – Full-Time Equivalent
GUI – Graphical User Interface
IoT – Internet of Things
KPIs – Key Performance Indicators
ML – Machine Learning
NLP – Natural Language Processing
OCR – Optical Character Recognition
OS – Operating System
PDD – Process Definition Document
ROI – Return on Investment
RPA – Robotic Process Automation
SaaS – Software as a Service
SE – Schneider Electronics
T&E – Travel and Expense
VDC – Virtual Delivery Center

INTRODUCTION

We live in a fast-changing business and industry environment. In recent years, most companies have focused on digitalization and autonomous systems that are driven by data collected in real-time, with the aim of improving products or services, reducing costs, and increasing productivity. This brought us to Industry 4.0, defined by many sources as the fourth Industrial Revolution. The first was mechanisation through water and steam power, followed by the second Industrial Revolution when electricity came into manufacturing, and the third with computers. The main drivers of Industry 4.0 - collecting data in real-time and using it for operations without human intervention - are referred to as the Internet of Things, Industrial Internet of Things, and the Internet of Systems (Marr, 2018). One of the corresponding trends today is Robotic Process Automation (hereinafter RPA) as one of the effective and efficient elements of the Lean approach. Moreover, it is not clearly defined whether RPA is a part of the Third Industrial Revolution or Industry 4.0, as it has been developed in-between (Kopeć, et al., 2018). However, we can see that RPA is changing the business landscape as we know it. More and more business processes are being automated and if an organisation is lagging behind its competitors in terms of RPA right now, it is probably already losing a major competitive advantage on the market (Fernandez & Aman, 2018).

The first time the term Robotic Process Automation appeared was in the early 2000s. The most common assumption is probably that RPA is about physical robots to automate movements and tasks in industrial facilities. However, one of the definitions is that RPA consists of methods, systems, and devices, including computer software encoded on computer memories, with the goal of automating manual processes (Fernandez & Aman, 2018). RPA automates a high volume of manual, repetitive, daily tasks that were previously performed by employees. By automating these tasks, employees can focus on more creative and innovative tasks (Fernandez & Aman, 2018).

RPA brings many benefits to an organisation, such as; (I) overall cost reduction as the average cost of developing and operating a robot is lower than a cost of a full-time employee, (II) speed and productivity are extremely high as the software is able to operate 24/7/365, (III) easy scalability and high flexibility, and (IV) accuracy and compliance as robots are 100% accurate, eliminating the cost of human error (Kommera, 2019).

Several best practices have been developed for implementing RPA in an organisation. The first step is the Proof of Concept to validate the concept, then moving to a Pilot where the end-to-end process is automated, including all exceptions and errors. Once some pilot processes have been successfully automated and moved to production, a dedicated team for RPA is created as a Centre of Excellence (hereinafter CoE) (Anagnoste, 2018). The task of the CoE's is to identify suitable business processes in different departments in an organisation, to build software robots starting with the simplest and most profitable ones

(higher calculated Return on Investment), and at the end to monitor and maintain the already implemented software robots (Anagnoste, 2018).

RPA is the next step technology from Orchestrator Automation, which is the way of automating parts of business processes within an application – macros, scripting. When RPA emerged it quickly overtook macros, because the RPA tool has ways to communicate with multiple applications in the same process automation workflow (Kommera, 2019). The basic RPA technology only focuses on repetitive, manual tasks, while on the other hand more and more RPA software providers have already implemented some cognitive and intelligent process automation capabilities in their software; some of those are Machine Learning, Natural Language Processing, and Cognitive Computer Vision. With these capabilities, we can no longer talk about RPA, but we can say that it is Cognitive or Intelligent Robotic Process Automation. People think that Intelligent Robots are the future, but if we look at the basic RPA software today, we can already incorporate a lot of Intelligent Robotics in our workflow. Furthermore, the approach of "training" the robot instead of "programming" it is already in use in some business automation cases (Kommera, 2019).

The purpose of my master's thesis is to help companies to easily realise the benefits of RPA. I want to show that the implementation of RPA is not that complicated, while also taking into account that RPA technology brings great benefits in a very short time. However, RPA technology cannot bring promised benefits if a company does not set a clear RPA implementation strategy from the beginning. I would also like to explore the ethical side of robotic process automation because I think many employees in various organisations do not readily welcome RPA. The most common fear is the takeover of human jobs by robots, and this can be a big challenge when implementing RPA.

The main objective of this thesis is to define the strategy for the first step of implementation of RPA in an organisation. As an example I have chosen the situation where RPA is implemented in the Human Resource department at the beginning and later scaled to an entire organisation. To support the main objective of the thesis, I have set supporting objectives, which include a literature review of RPA, an overview of the most commonly used RPA platforms and software, the future of RPA technology towards Intelligent RPA, and identifying how RPA will change human jobs, the labour market and the required employee skills in the near future. Furthermore, I would like to provide a methodology for pilot RPA implementation and an explanation evaluation tool for selecting relevant business processes for software automation to further support the main objective. I believe that this knowledge can move the organisation to start the RPA journey.

The master's thesis will address the following research questions:

- How can Robotic Process Automation be successfully implemented in the organisation?
- What are the main benefits of RPA?
- What are the main limitations of RPA?

- What are the main parameters for evaluating RPA processes?
- How can small businesses implement RPA?
- What are best practices for implementing RPA technology?

The master's thesis will be divided into three main parts; (I) RPA literature overview, (II) case studies of RPA on Human Resource department, and (III) plan for RPA implementation in the organisation with discussion. The first part will be achieved through an exploratory research of the existing literature, followed by the second part, where cases of RPA implementation in different organisations will be analysed. The second part – examples of RPA cases in the HR department – is my contribution. The last part will focus on a holistic strategic and operational plan for RPA implementation in different organisations. A combination of literature overview, use cases, best practices, and practical implementations will be combined in the last two parts. In addition, the second and third parts will be supported by interviews with different RPA developers and other RPA specialists to enrich the analysis with practical knowledge from RPA implementation cases. In the end, the discussion will combine all parts of the master's thesis and provide a valuable conclusion and enrichment of the RPA implementation literature.

1 INDUSTRIAL REVOLUTIONS, INDUSTRY 4.0 AND DIGITALISATION

In recent years, digitisation - autonomous systems and cognitive technologies for many - has been a top priority for every company when setting its business strategy. All digitisation projects bring with them a lot of data collected in real-time, enabling the fourth Industrial Revolution - Industry 4.0. One of the biggest challenges in Industry 4.0 is not only collecting data, but also processing relevant data to derive value from it (Marr, 2018).

Industrialisation began with the first Industrial Revolution between the 1760s and 1820s (Roser, 2015) when mechanisation with steam power was developed by James Watt and Matthew Boulton. The steam engine became the main source of power in the nineteenth century (Hills, 1989). Later on, the second Industrial Revolution appeared around the year 1870 when mass production started. The most famous case from the second Industrial Revolution is the assembly line of Henry Ford – mass production of a whole car on an assembly line – in 1913. Furthermore, electricity was also introduced into production during the second Industrial Revolution (Roser, 2015).

Starting in 1950s, we speak of the Third Industrial Revolution, which is the use of computers and automation in manufacturing (Roser, 2015). We can also use the term digital revolution because during this period many business processes were digitalised. Moreover, Jeremy Greenwood (1997) emphasises that the Third Industrial Revolution was the age of information and Information Technology. But the perspective of the labour market, the

adoption of new technologies brought hidden costs in terms of learning as skilled workers had an advantage in learning. The increase in demand for skilled labour brought with it a high differential in wages between skilled and unskilled labour. Another aspect of the Third Industrial Revolution was significant investment in IT, which consequently improved productivity – a dramatic improvement in productivity is also known for the first and second industrial revolutions (Greenwood, 1997). Figure 1 represents all four industrial revolutions and their main characteristics.

Figure 1: Industrial revolutions

1st	2nd	3rd	4th
Mechanization, water power, steam power	Mass production, assembly line, electricity	Computer and automation	Cyber Physical Systems
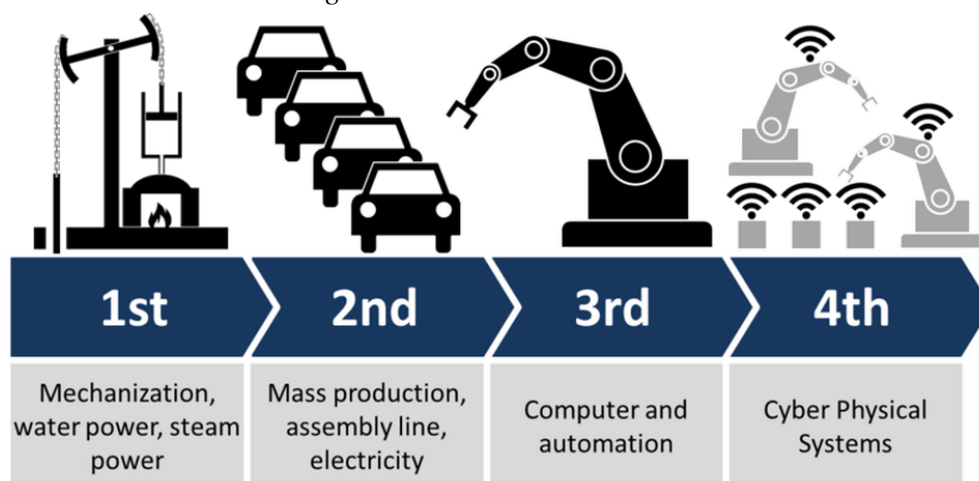
Source: Roser (2015).

In 2011, the German research union for economy and science approached Chancellor Merkel with the idea of launching a government-funded research programme focused on computers in industry that would maintain the technological edge of German industry. They suggested the name of the research *Industrial Revolution 4.0*, which Chancellor Merkel changed to *Industry 4.0* because she did not want to fund the idea of "revolution" in Germany. At the time, no one was quite sure what Industry 4.0 meant or and what it would bring. Everyone knew that it represented something with computers and industry (Roser, 2015). Industry 4.0 was supposed to be the first step towards smart factories, i.e. manufactures with the combination of cyber-physical systems, the Internet of Things, the Industrial Internet of Things, and the Internet of Systems (Marr, 2018). In practice, smart factories are factories, where machines are digitally networked to share up-to-date information and respond to other machines based on that information. Furthermore, with Radio Frequency Identity Chips we enable every part in the production process – semi-finished products or final products – to communicate with the production line (Roser, 2015).

Some experts believe that Industry 4.0 is a hot topic in industry because it could be categorised as an advanced Third Industrial Revolution. As mentioned by Roser (2015), there have been many similar hot topics in the past, such as:

- Digital Manufacturing (the 1970s) – something about manufacturing and computers, the outcome was not clear.
- Computer Integrated Manufacturing (the 1990s) – disappointment compared to promised results.
- Digital Factory (from 2000 onward) – inconclusive results.
- Factory 2.0 (from 2005 onward) – European Union's initiative, forgotten through time.
- Smart Factory (from around 2007) – programme of the University of Stuttgart, which in a sense merged with Industry 4.0.

Most of these topics promised a lot, but then there was quite a bit of disappointment because everyone was very optimistic about how these topics would change the industry as we know it (Roser, 2015).

2 ROBOTIC PROCESS AUTOMATION

RPA consists of methods, systems and devices, including computer software encoded on computer memories, with the goal of automating manual processes (Fernandez & Aman, 2018). It allows us to automate a high volume of manual, repetitive, daily tasks so that we can focus more on creative and innovative tasks (Fernandez & Aman, 2018).

2.1 Description of RPA

RPA is the next step technology to Orchestrator Automation, the ability to automate parts of business processes within an application – macros, scripting. When RPA emerged, it quickly overtook macros, because RPA tools have the ability to communicate with multiple applications in the same process automation workflow (Kommera, 2019).

Basic RPA technology only focuses on repetitive, manual tasks, while on the other hand more and more RPA software providers have already implemented some cognitive and intelligent process automation capabilities in their software; some of them are Machine Learning, Natural Language Processing, and Cognitive Computer Vision. With these capabilities, we can no longer talk about RPA, but we can say that it is Cognitive or Intelligent Robotic Process Automation. People think that Intelligent Robots are the future, but if we look at basic RPA software today, we can already incorporate a lot of Intelligent Robotics into our workflow. Furthermore, the approach of "training" the robot instead of "programming" it is already in use in some business automation cases (Kommera, 2019).

Each year, Gartner – one of the world's leading research and advisory companies – publishes the "Gartner Top 10 Strategic Technology Trends". This article lists the top technology trends that will impact the coming year. For 2020, Gartner lists hyper-automation as the number one trend. "Hyper-automation deals with the application of advanced technologies,

including Artificial Intelligence (hereinafter AI) and Machine Learning (hereinafter ML), to increasingly automate processes and augment humans. Hyper-automation spans a range of tools that can be automated, but also refers to the sophistication of automation (i.e., discover, analyse, design, automate, measure, monitor, reassess)" according to Kasey Panetta, Gartner journalist (Panetta, 2019). Hyper-automation is the combination of Robotic Process Automation, intelligent business management software and Artificial Intelligence (Panetta, 2019).

2.1.1 Attended automation

Software robots can interact with employees – attended robots; or they can work alone – unattended robots. The mixture of the two types is called hybrid automation. By UiPath (2019a) – one of the largest providers of RPA software – the attended automation is defined as: "software robots that can work alongside humans to share the workload in real-time. Humans collaborating with robots can get more done, faster, and with fewer errors. Their robots can do tedious tasks so employees can focus on the work they love" (UiPath, 2017).

An example of attended automation is shown in Figure 2. Above the line on the figure is the workload for the employee, and below the line is the workload for the robot. In our case, the sales manager triggers the robot to start the process. If the robot is currently busy with other tasks and none of the other robots are available, the task goes to the waiting line (Col, 2017). When the robot is free, it starts executing tasks from waiting line. The robot from our example collects data from different customer databases and Customer Relationship Management (hereinafter CRM) Systems and sends the result back to the sales manager. The sales manager then checks the generated results and triggers the second part of the robot's workload. Processes such as making an offer, order placement and order cancellation are done by the robot, which also checks for possible exceptions in the process. If there are no exceptions, the robot ends the automation cycle and is immediately available to process other tasks. In case of an exception, the sales manager gets the data about the exception and takes control of the process (Col, 2017).

Attended automation is useful when the processes have various decision points in the middle, and these decision points are based on previously provided results from the robot that cannot be decided by the robot itself or encoded in the robot flow (Col, 2017).

Figure 2: Attended automation flowchart
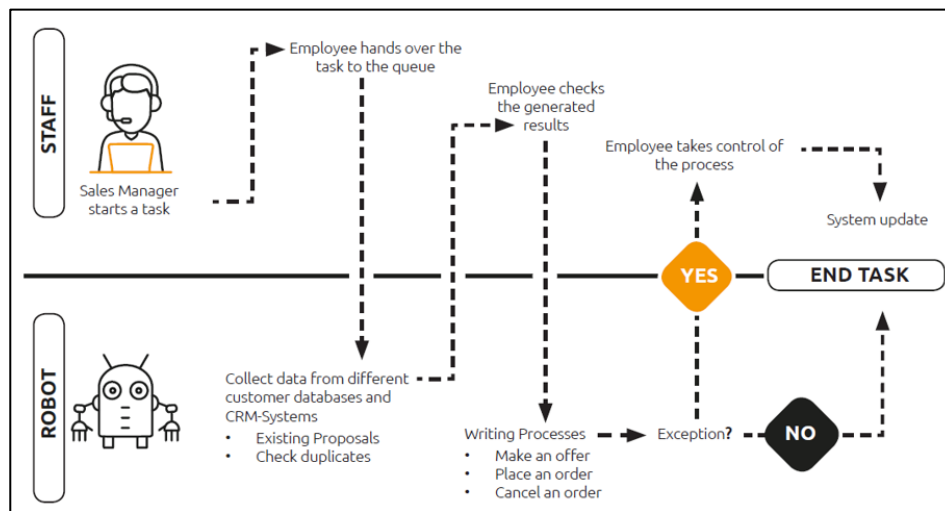
Source: Col (2017).

2.1.2 Unattended automation

The second type of automation is unattended automation, which is defined as: "the concept of automation without human intervention – or, at the very least, as little human intervention as possible given the scenario or context. Actions in unattended automation are self-triggered by the software robots themselves and work is completed continuously in a batch-mode model that allows automation software to carry out actions on a 24/7/365 basis" (UiPath, 2017).

An example of unattended automation is shown in Figure 3. The robot can be triggered by the sales manager or automatically when new e-mails are received. The robot can check an income mailbox periodically – scheduled in advance – or we can set the robot to check an income mailbox all the time – when the robot is not busy with any other processes (Col, 2017). When the mail is read, the robot downloads mail attachments. In this case, it is an Excel file. The next step is that the robot opens and reads the content of the downloaded Excel file, opens Enterprise Resource Planning (hereinafter ERP) System and writes information from the Excel document into ERP System. Then process output information is sent to the sales manager if required, otherwise, the robot terminated the process (Col, 2017).

We usually build unattended automation with the goal of automating back-office processes, data migration, etc. where employees do not need to interact with the robot. It can run autonomously on servers. "However, the standalone robot remains under the supervision of human beings, as it is necessary to monitor the execution of processes to ensure they are successful. When an exception or problem occurs, a human expert (a "robot supervisor") must determine the cause, correct it, and then restart the robots so that the process resumes where it had stopped" says Pierre Col, an expert at SAP Intelligent RPA (2017).

Figure 3: Unattended automation flowchart
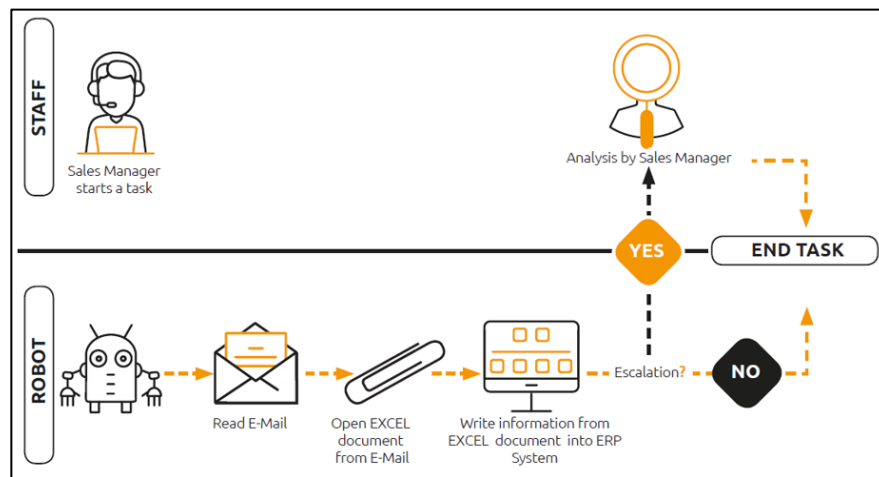
Source: Col (2017).

2.2 Key drivers, benefits and challenges of RPA

Organisations can use RPA to generate various business benefits. Most people think that the most they can get from RPA implementation is a reduction in operating costs. If companies focus only on cost savings, they run a higher risk of missing opportunities to improve customer experience and employees satisfaction; one of the examples of this type of benefit is giving employees more time to focus on important, more creative tasks (Lacity & Willcocks, 2016).

UiPath – one of the leading providers of RPA software – has identified the key drivers responsible for the huge popularity of RPA in enterprises today. These drivers are (UiPath, 2019b):

- Rapid benefits realisation.
- Minimal upfront investment.
- No disruption to underlying systems.
- Highly scalable, adapts to changing business environment.

Kommera (2019) lists the main benefits of RPA for an organisation, namely: (I) overall cost reduction as the average cost of developing and running the robot is lower than the cost of a full-time employee, (II) speed and productivity are extremely high due to software availability to work 24/7/365, (III) easy scalability and high flexibility, and (IV) accuracy and compliance as robots are 100% accurate, eliminating the cost of human error.

Implementing RPA is fast because an organisation does not need to make changes to existing applications and thus usually does not need to make major changes to the IT infrastructure because of RPA. The payback of RPA implementation is extremely fast compared to other improvement projects and therefore we can the measure payback time of RPA in months, not years as-is common. The differences in business processes, enterprise architecture and

IT architecture between organisations are the main reasons why each RPA implementation project brings different benefits (Alberth & Mattern, 2017). These are (Alberth & Mattern, 2017):

- Low cost of RPA software licences compared to high return on investment.
- Scalable and benefits from economies of scale.
- Potential process improvements reveal themselves during the implementation stage – identifying gaps, deficiencies, etc.
- Proper RPA implementation generates quality documentation – enables faster automation change and error detection.
- Minimal changes required to current processes – only if the change improves the business process, makes it faster and easier, or generates more appropriate output from the process.

RPA also contributes to Lean Six Sigma programmes because "virtual workers" produce a lot of data from the process, which is required for Six Sigma. This data cannot be generated when tasks are processed manually (Alberth & Mattern, 2017).

When the implementer of RPA calculates Return on Investment (hereinafter ROI), the total value from automation is not just financial. Other factors that must be considered in the calculation and can bring value are (Kommera, 2019):

- Optimisation of operating costs.
- Reduction of cycle time.
- Increase in quality – less rework and no errors.
- Flexibility – scalability, tasks are always completed before deadline as tasks are scheduled in RPA software, seasonality is covered with free robot capacity or with more robots.
- Penalties from interest payments and government are reduced.
- Better compliance – audit logs are more detailed.
- Better overview – dashboard overview of processed tasks and results in real-time.

Based on the Deloitte's third annual Global RPA Survey, 53% of respondents already started with their RPA journey. Average cost reduction of RPA implementation projects is 59 %. Also interesting result from the survey is the fact that 78 % of those who have already implemented RPA expect to significantly increase investment in RPA over the next three years (Deloitte, 2018).

Kopeć et al. (2018) identified RPA challenges in three key areas: Technical Challenge, Organisational Challenge and Socioeconomic Challenge. Technical challenge: "Many rule-based robots are difficult to scale because the rules are written by hand. Moreover, they are difficult to maintain to remain flexible, given the varied format and structure of the data to

be processed, which often includes e-mails, web forms, faxes, scans of paper documents, phone calls or even financial or sensor data. Moreover, some output documents still need to be produced on paper and sent out to clients. Data already present in the current systems are often of poor quality in general, or for automation as it lacks tags and division by categories; on top of this it may be outdated and based on old regulations, checks and processes which makes it difficult to use machine learning to properly train neural networks" (Kopeć et al., 2018) .

The organisational challenge of RPA implementation is evident in most companies because their current business processes involve "complex chains of manufacturing involving multiple approval steps, contractors, clients and convoluted internal procedures" (Alberth & Mattern, 2017). To this end, companies often use legacy software, which is customised to their needs. This software is usually provided by various external contractors and includes rule-based processes. "When automation is delivered with RPA solutions, they are often neither intuitive nor user-friendly and prone to errors. At the same time, multiple organisations lack sufficient knowledge about their own business processes, especially on handling exceptions and allowing for shortcuts and bypasses to effectively build such robots on their own" (Alberth & Mattern, 2017). These challenges can be mitigated in strategically correct RPA implementation cycle, in the process assessment stage where a lack of software and process documentation can be identified (Alberth & Mattern, 2017).

Ethical dilemmas arise when implementing RPA because it usually involves and is followed by organisational restructuring and massive job loss. When robots handle many tasks that are done human workers, the need for low-skilled workers decreases. This is usually the main obstacle to automation – employees know that many jobs are at risk if RPA implementation is successful. For this reason organisations need to establish a strategy for changing mundane work tasks (Kopeć et al., 2018). Repetitive and low-value-added tasks are automated, and creative and innovative tasks must be added to employees workloads in the initial stages of RPA implementation. Another good practice to overcome cooperation of employees in the RPA implementation is to introduce the RPA to everyone in the organisation and invite people from different departments and levels to collaborate and contribute to all stages of implementation (Kopeć et al., 2018).
Other challenges recognised by Kommera (2019) are:

- Pace to change – companies set expectations for RPA too high, but it usually takes years to make any real progress in automation. First, proof of the concept and piloting must be done, then employees must be trained, and over time, the company's culture must change toward an "automation-friendly" mind set. Only then will employees see opportunities of RPA.
- Limited availability of skilled labour – high demand for skilled RPA developers and architects on the market.
- Governance – inadequate governance operating model to manage and mitigate risks.

- Data intake – many companies are too busy with the challenges at the beginning of RPA implementation, so they overlook the data architecture.
- Industry expertise –more industry-specific expertise is needed when scaling RPA – there is usually little or no expertise in certain. On the other hand, if a company is the first to implement RPA in a particular industry, it gains a competitive advantage over the competition.
- Digital Workforce – many companies do not have a maintenance plan in place in case there are automation failures or changes in the underlying systems. The digital workforce is typically a new form of company's asset and they have no experience with them.
- Technology overhead – the company needs to choose an RPA provider at the beginning of the implementation, but this can be a problem as there are many RPA providers on the market. In later stages of implementation, it is hard to change the RPA vendor.

2.3 Process relevance for Robotic Process Automation

When considering RPA implementation, it is important to understand which processes are suitable for Robotic Process Automation. This section answers the research question of this master's thesis: "What are the main parameters for evaluating RPA processes?" Figure 4 shows the relevance of RPA based on two factors; the x-axis shows the different cases – when two cases are of the same type or similar and can be processed similarly, and the y-axis shows the case frequency. Usually, the graph shows Pareto distribution. This means that 80% of cases by frequency can be explained by 20% of different cases. These cases are the ones that are first considered as being suitable for RPA. On the other side of Figure 4 – right side – is a range of cases that are not frequent enough to be considered for RPA because the cost of automation increases as we move from left to right side of Figure 4. These processes still need to be done by humans. In the middle area are located RPA candidate processes, that should be further analysed and evaluated if they are relevant for RPA (Aalst, Bickher & Heinzl, 2018).

Evaluating candidates for RPA by different cases and case frequencies is only one criterion. Some of the other most common process evaluation questions are (Kommera, 2019):

- Is the process rule-based and repetitive?
- Do we have access to structured data?
- Is the volume of tasks high or not constant – seasonality?
- Should the RPA software handle the task with the user interface?
- Is the process currently performed by more than one Full-Time Equivalent (hereinafter FTE)?
- Are the applications used stable – do they change slightly over time?
- Does the process provide business value? If not, reconsider whether it is even necessary to run it manually.

Figure 4: Relevant processes for RPA
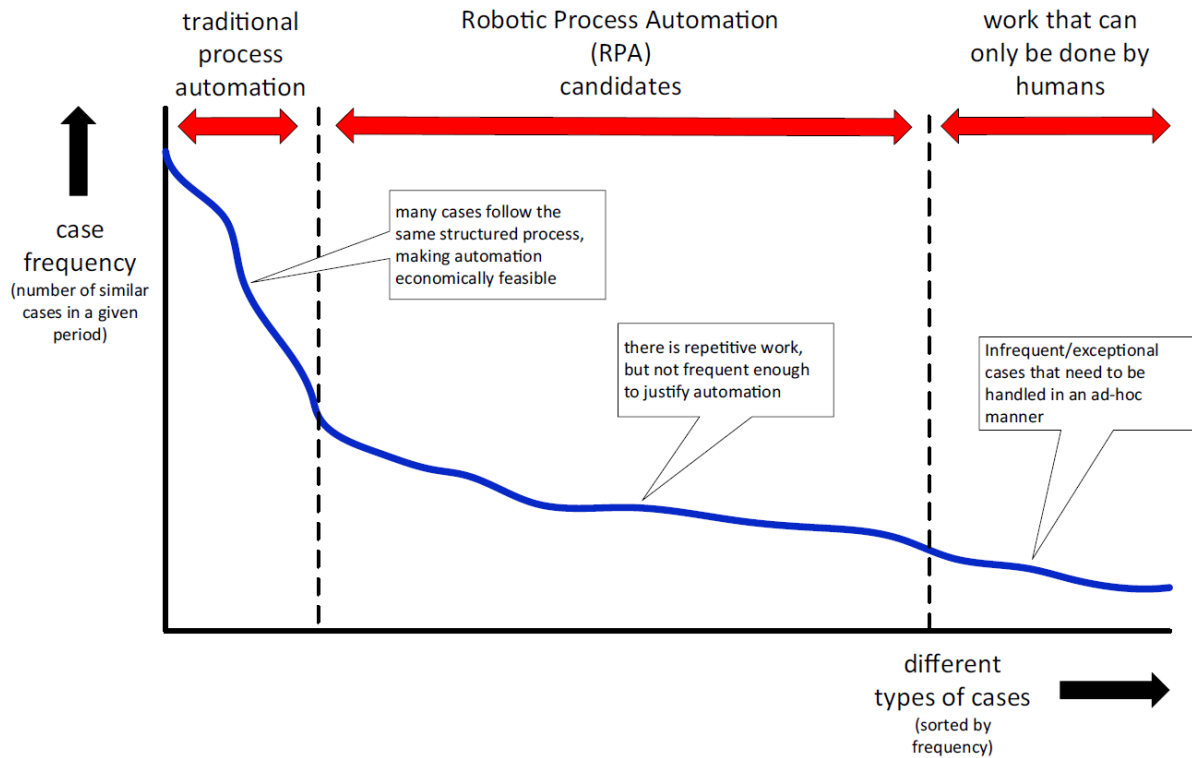
Source: Aalst, Bickher & Heinzl (2018).

Later in the thesis, the framework example for evaluating the suitability of the process for RPA will be presented.

2.4 Overview of leading Robotic Process Automation software

The market of RPA software providers has been growing rapidly in the last few years. In 2017, there were over 50 providers on the market. The price range per robot is between € 5,000 and € 10,000, depending on the different pricing models of each provider (Alberth & Mattern, 2017). Two of the most popular pricing models are the annual licence per robot where a customer pays the price for each robot and consumption-based pricing model where customers pay as much as they use. It can be also described as renting robots or "Software as a Service" (hereinafter SaaS). It is difficult to compare software providers based on price alone, as every company is different and needs to figure out which pricing model is more appropriate in a given situation (Tornbohm & Dunie, 2017).

The most important factors – besides price – in choosing among RPA software providers can be sorted into three groups: programming options, cognitive capabilities and usage of RPA software. The latter is divided into attended, unattended and hybrid automation (AI Multiple, 2020).

Among RPA software are five programming options for automation robots (AI Multiple, 2020):

- Coding the robot in the chosen programming language. For this option, a company must have advanced IT developers who can write code in the programming language chosen by RPA providers. If a company does not have programmers but still wants to implement a particular RPA software that requires advanced programming skills, it typically outsources all development, testing, operation and support of the RPA solution.
- Low coding solutions – a robot is developed by "drag & drop" mode with some basic code writing. Most RPA providers are offering that solution nowadays. Besides, most software still allows coding the robot, with a simple switch between modes in Graphical User Interface (hereinafter GUI) (AI Multiple, 2020). GUI is an interface of graphical elements – windows, icons, buttons, etc. – and is designed to allow users to communicate with the software (TechTerms, 2020).
- Recording – similar to recording macros in Excel. It is a way of programming the robot where the RPA software follows the user's task processing and then creates its own version of tasks and actions that should be the same or similar to the processing steps performed by the user. Some RPA providers have integrated recording into the robot development GUI.
- No coding solutions – RPA solution supported by powerful user interface. Only a few RPA providers offer this solution.
- Self-learning robots – not so common among RPA providers, because it is an upgrade of a recording solution. The difference is that basic recording uses only one record of the process to provide a solution, but self-learning robots use multiple, historical data, usually using the employee's activity performed over an extended period of time.

It is important to choose the RPA software that is compatible with the operating system used in a company. Most RPA tools support Windows operating system (hereinafter OS), but few of them can run on Mac OS or Linux. This is usually not the problem as companies like to use Windows OS due to the employees' knowledge of the OS (AI Multiple, 2020).

The last factor to consider when choosing among RPA software providers is cognitive capabilities – Artificial Intelligence such as Optical Character Recognition (hereinafter OCR), Natural Language Processing (hereinafter NLP), and Machine Learning. In the market, RPA solutions are available with different levels of cognitive capabilities– without cognitive capabilities, with inbuilt cognitive capabilities or with cognitive capabilities supported by the marketplace where different cognitive solutions can be purchased from different vendors and are compatible with the RPA software provider (AI Multiple, 2020).

Figure 5: Robotic Process Automation providers

Source: Miers, Kerremans, Ray and Tornbohm (2020).

The RPA solution provider market can be divided into 4 quadrants – market leaders, market challengers, niche players and visionaries – as shown in Figure 5. They are categorised based on the completeness of their vision and the ability to execute it. These two factors are the most important on the RPA market as each RPA solution provider must set its strategy and vision in such a way to show its own competitive advantage over competitors, but it also needs to be realisable. Also, providing regular updates of the RPA solution – including new, innovative products and tools – sets the RPA providers apart on the market. As of early 2019, the leading vendors UiPath, Blue Prism and Automation Anywhere had a combined market value of over $ 11 billion. Moreover, RPA is the software sub-segment with the highest growth – in 2018, the year-to-year growth was over 63% (Miers, Kerremans, Ray & Tornbohm, 2020).

Table 1: Detailed specification of the three most popular RPA software providers

	UiPath	blueprism	AUTOMATION ANYWHERE Go be great.
Adoption of Attended robots	30%	Available via Trust Portal	20%
Adoption of Unattended robots	70%	100%	80%
User-friendliness (programming options)	For non-developers and for developers	For advanced developers	For developers
Process designer	Visual process-based	Visual process-based	Script-based
Scalability	Can handle any process, despite its complexity	Yes	Large scale robot deployment is limited
Maintenance and support services provided by software provider	Trainings, Video tutorials, strong Community forum and implementation support, certification platform	Help Guide, Online-portal, Email, Contracts, Trainings	Trainings & Certifications
Base technology	Microsoft – SharePoint wf, Elasticsearch, Kibana	C#	Microsoft
OS Support	Windows, Mac, Web-based	Windows, Mac, Web-based	Windows, Mac, Web-based
Architecture	Web-Based Orchestrator	Client Server Architecture	Client Server Architecture
Is recorder available?	Yes	No	Yes
Industry size	Small, Medium, Large	Medium, Large	Medium, Large
Accuracy	Best for Citrix automation, designed for BPO automation.	Supports any platform.	Reasonable accuracy across mediums.
Pricing model	Per robot	Per robot	Per process

Adapted from Software Testing Help (2020); Tornbohm & Dunie (2017); RPA Training (2020).

Table 1 shows more detailed specification of three leading vendors of RPA software: UiPath, Blue Prism and Automation Anywhere. The table can be the first overview for the companies when choosing among main three RPA software providers, but it is not enough to make the final decision because more detailed research should be done by every company. Also, choosing only between leading three RPA software providers is not enough. When more RPA vendors are considered in preliminary stage of RPA journey, better is the understanding of RPA market.

Table 1 considers a number of factors, which need to be examined before selecting the right RPA software provider for a particular situation. One way to start is to review the different Process Designers (user interfaces) used by RPA software. It tells us what kind of GUI the RPA software we will be working on. Two main types are visual process-based and script-based. In Figure 6, we can see that UiPath and Blue Prism have a visual process-based user interface while Automation Anywhere has a script-based user interface. The main difference

is in a visual process-based user interface, the process is shown with blocks and arrows as a flowchart, while in a script-based user interface the process is written as a code (Software Testing Help, 2020).

Figure 6: Process designers of UiPath, Blue Prism and Automation Anywhere
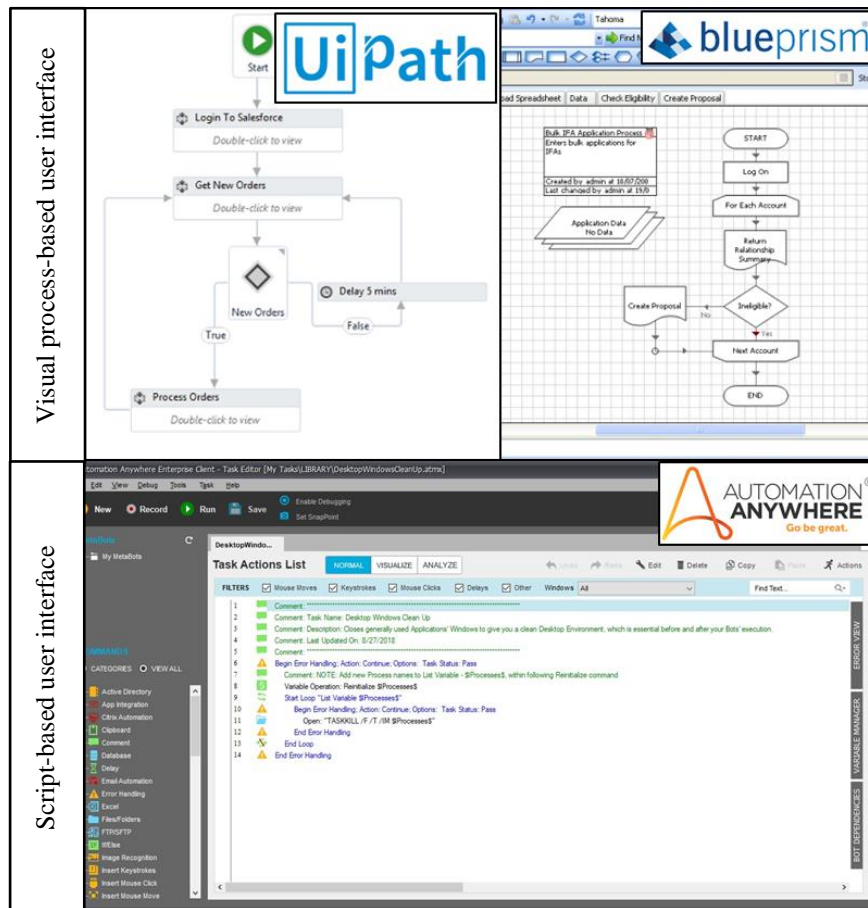
Source: WebScraping (2015); MindMajix (2020); AutomationAnywhere (2020).

2.5 Detailed overview of the UiPath solution

I showed a detailed overview of the entire RPA solution from UiPath – the most popular RPA software provider. UiPath is a company focused exclusively on providing RPA solutions, founded in 2005 in Bucharest, Romania. UiPath offered its first desktop automation in 2013, and in 2015, the company launched its enterprise platform (UiPath, 2020b). Nowadays, UiPath brings new sub-products and product versions of their RPA solution on a monthly basis. Currently, the community of UiPath RPA enthusiasts, developers and specialists consists of more than 250.000 people, who automate processes in more than 5.000 global enterprises and is trusted by 50% of the top 50 companies from the Global 500 list of companies (UiPath, 2020b).

2.5.1 UiPath Community Ecosystem

UiPath gained popularity by designing a user-friendly software and with strong community ecosystem, which is shown in Figure 7. The UiPath Community Ecosystem supports developers' both in the learning stage and in the development of RPA solutions and their implementation (UiPath, 2019c).

Figure 7: UiPath Community Ecosystem
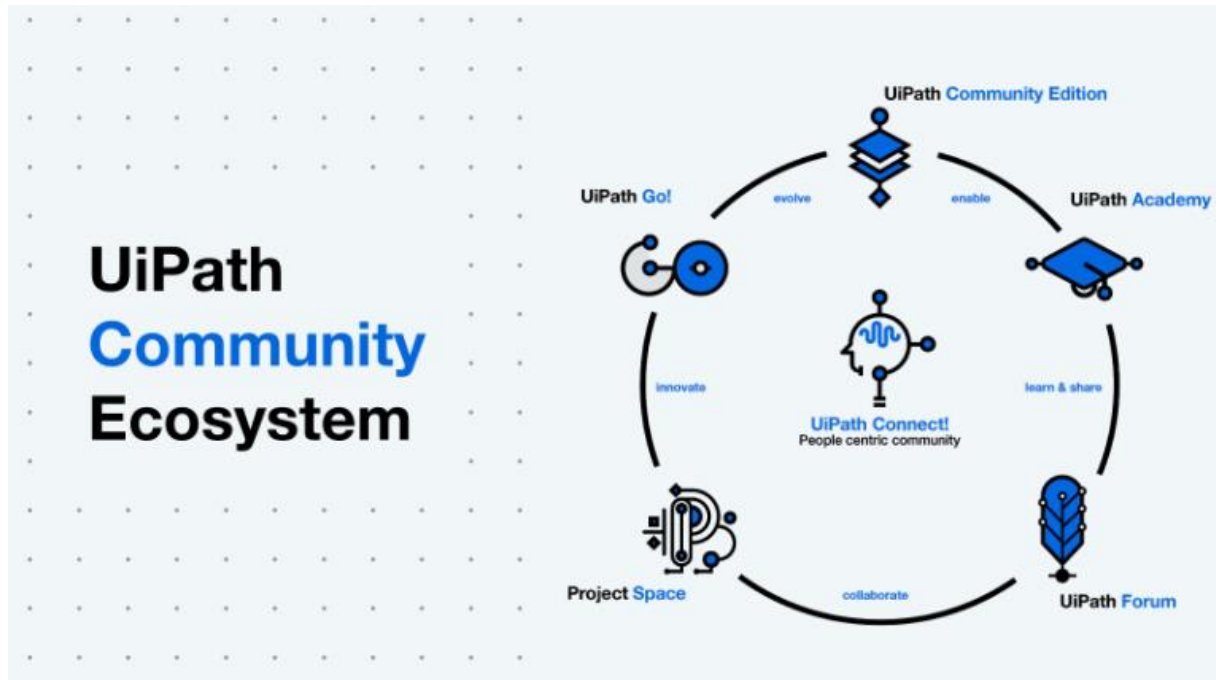
Source: UiPath (2019c).

Most RPA developers start their RPA learning journey with UiPath Community Edition, which is a free version of payable RPA solution. For large organisation there is a free version called UiPath Enterprise, which offers 60-day trial period. This allows users to develop and test robots before purchasing the product. The only limit is in the production capabilities, where the number of robots is limited. The next step is to learn how to automate tasks and processes (UiPath, 2019c). With no financial investment, users can learn how to automate tasks and processes on UiPath Academy – the user-friendly learning platform offers multiple RPA learning paths, from RPA developer training to Solution Architect, Infrastructure Engineer, Implementation Manager and Business Analyst. Each of the roles has different tasks in automation projects – for example, the Solution Architect creates Process Definition Document (hereinafter PDD) which contains a detailed current and future process description, while the RPA developer uses the PDD as a guide to develop the automation process (UiPath, 2020c).

A very helpful part of the UiPath Community Ecosystem is the UiPath Forum – a very responsive and helpful forum of RPA developers and UiPath technical support team,

available 24/7/365. The UiPath Forum helps users in the initial steps of learning the software and later in the development stage when errors occur. Project Space – part of the UiPath Connect! platform – allows users to collaborate with RPA professionals from around the world on the same project (UiPath, 2019c).

Supporting this part of the UiPath Community Ecosystem is UiPath Go! – marketplace of already built components of automation projects. When automating a generic process, the user can search for some components or even the whole pre-built process automation, downloading and customising them to the desired settings, which significantly reduces the development time and effort per process (UiPath, 2019c).

2.5.2 UiPath end-to-end RPA solution

In addition to the UiPath Community Ecosystem – which simplifies the use of the UiPath RPA solution – UiPath offers its customers a comprehensive RPA solution, as shown in Figure 8. The holistic approach provides the UiPath users with transparent automation – from planning the automation to developing, managing and operating the robot, to measuring the impact at the end (UiPath, 2020d).

Figure 8: UiPath end-to-end RPA solution

Plan	Build	Manage	Run	Engage	Measure
Scientifically plan your RPA implementation, powered by AI	Democratize the design and testing of workflows, from the simple to the complex	Securely deploy and manage automations	Robots work with your applications to carry out automations	The system of engagement for humans and robots working together	Align RPA operations with strategic business outcomes with powerful, embedded analytics

Source: UiPath (2020d).

The first part is automation planning. UiPath offers Explorer, a solution that allows every employee in an organisation to records their own daily tasks. Explorer has a built-in process recorder and a tool to simplify the creation of process flows. These process descriptions can be entered when selecting processes for automation. Employees responsible for RPA can go through the list of processes, evaluate them, and select which ones to automate first based on the potential ROI calculated by the Explorer (UiPath, 2020d).

One of the main components of UiPath's RPA solution is the automation of construction processes. UiPath has developed Studio, an environment where the user visually models the automation - without code or scripting. UiPath Studio has a built-in recorder that monitors the work and a variety of templates that simplify the automation build (UiPath, 2020e). The latest versions of UiPath Studio have an additional mode built in, StudioX. The purpose of StudioX is to provide an even simpler development interface intended for business users who want quickly delivered, non-complex automation. In addition to the testing capabilities of UiPath Studio, StudioT is currently under development - a test mode for Studio that sets up the specific test environment (UiPath, 2020e).

When an automation process flow is created in UiPath Studio, the management of robots and automation is done with UiPath Orchestrator. It is a web-based dashboard for managing robots. Robots can be deployed, scheduled, and managed in Orchestrator. UiPath also provides monitoring, operation, and management of robots through the Orchestrator mobile app (UiPath, 2020f).

UiPath Robot runs an automation process on a local machine – the term "machine" refers to any physical computer or virtual machine. The robot runs the automation process when Orchestrator gives the signal or is started from UiPath Studio – running from Orchestrator is typically used in production, while running from Studio is suitable for testing. The basic automation infrastructure has one Orchestrator, where the automation processes are managed, and several UiPath robots – one on each machine – which is responsible for running an automation process on its machine (UiPath, 2020f).

The focus of the last two segments of the UiPath end-to-end RPA solution is to engage and measure automation. To engage means to collaborate with robots. Collaborating with the attended robot is easy, but communicating with the unattended robot can be done through tasks. "Unattended robots automatically create tasks when human intervention is required, and work on other automation tasks while human input is pending. Once the authorised user has completed the task, the robots are notified and can resume the previous automation" (UiPath, 2020d). Users can also extend a task or send it to others in the team to solve it. A task can come from different machines that are connected to the same Orchestrator or it can be received from one of the team members (UiPath, 2020d).

Figure 9: UiPath Insights interactive dashboard

Source: UiPath (2020f).

Measuring process automation when using the UiPath RPA solution is done on UiPath Insights – the platform for measuring automation effectiveness. It allows measuring the alignment of organisational strategy with automation by defining custom Key Performance Indicators (hereinafter KPIs). Examples of KPIs that can be set for RPA are time and money saved by RPA, success rate of RPA, etc. (UiPath, 2020g). Furthermore, UiPath Insights allows an easy report generation via report element drag-drop mode from the library. UiPath Insights Reports are interactive dashboards that can be quickly customised to meet the needs of reporting to specific stakeholders. This functionality makes the flow of information about RPA in an organisation extremely effective. Users can access UiPath Insights from the Orchestrator platform (UiPath, 2020g). Figure 9 shows an example of an interactive dashboard, created on the UiPath Insights.

2.5.3 UiPath Recorders

Recorders are one of the great benefits of the RPA solution. UiPath has integrated four recorders into UiPath Studio (UiPath, 2020h):

- Basic – very basic recorder, suitable for recording single activities. Slower when recording multiple activities, as the recorder creates an automation activity with all the information for each of the multiple activities.
- Desktop – faster than the basic recorder. The difference is that it creates the automation information for multiple activities within the same application only once. When we start the robot, it does not need to read the same information for every "click" activity.

- Web – for recording actions in browsers and web applications.
- Citrix – like a desktop recorder, but for Citrix environments – for example, virtual machines, remote desktop access, and for SAP. It accesses and communicates with the application only on the basis of image, text, or keyboard automation, which also requires clear positioning of elements.

Comparing UiPath recorders with Automation Anywhere recorders, they are similar. When comparing Automation Anywhere recorders with UiPath: Automation Anywhere Screen Recorder is similar to UiPath Basic Recorder, Smart Recorder to UiPath Desktop Recorder and both have Web Recorder. UiPath is well-known for its Citrix Recorder, which is the leading recorder of Citrix environments among competitors (DotNetBasic, 2019).

2.6 Real life examples of implementation of the UiPath RPA solution

"RPA implementation can provide companies with a cost reduction of 35-65% for onshore process operations and 10-30% in offshore delivery. An investment recovery period is 6-9 months" (UiPath, 2016). The following are some of the most well-known UiPath implementation examples from the field. All of them started with the pilot project or proof of concept and quickly scaled RPA up to the production stage.

2.6.1 Nielsen

Nielsen - global market research company - focuses on analysing lots of data to help other companies make important business decisions and investments. More than 50,000 employees in over 100 countries work at Nielsen worldwide and RPA presented the immediate case for scaling, which is also a big challenge. Nielsen shortened the time to deliver analytics to customers because of the need to process a large amount of data in a short period of time (UiPath, 2020i).

At Nielsen, they began the RPA journey in 2016 with RPA vendor UiPath. They set up a global Centre of Excellence and their main automation KPI was time savings, not dollar savings. This drastically helped increase the popularity and support of RPA across all departments in the company. Nielson's CoE initially consisted of 12 people, but today there are over 150 specialists in their various international locations. These experts identify automation processes in their area of work, then Nielson's core CoE team evaluates the technical feasibility of the identified processes and automates the selected processes - globally to create more value. Over 177 projects have been successfully completed. In the last 18 months, over 350,000 hours have been saved globally through RPA at a renowned company. Furthermore, their goal is to save 500,000 hours by the end of 2020 (UiPath, 2020i).

2.6.2 Copenhagen Municipality

The Municipality of Copenhagen (Denmark) needed to provide excellent customer service. Today, over 45,000 employees work in seven committees. The Municipality started its RPA implementation in 2015 with the pilot project in the Human Resource department. It took them four months to establish the robot in production and quickly expanded from 1 to 10 robots. Their next step was to establish a CoE to promote RPA across all seven committees. Their strategy was to inspire all committees to develop their own RPA experts. Their global CoE can support small automation projects and manage larger automation projects (UiPath, 2020j). Within 12 months, the CoE had 15 experts and governance policies and procedures related to RPA were already in place. The Municipality of Copenhagen successfully automated 75 processes so far, with 50 attended and 6 unattended robots, saving over 8,500 hours per year. Their strategy for the future is to focus on a hybrid RPA environment – a combination of both attended and unattended robots. This allows them to automate more complex processes (UiPath, 2020j).

2.6.3 DHL Global Forwarding, Freight

DHL Global Forwarding, Freight (hereinafter DGFF) is the leading provider of land, air and ocean freight transportation within Deutsche Post DHL Group. DGFF's Global Service Centre consists of five centres with over 4,500 employees. They started their RPA journey with a pilot project that brought them ROI in one month (UiPath, 2020k). They established the CoE, which is common in other RPA journey cases, but alongside this they established the Virtual Delivery Centre (hereafter VDC). The difference between CoE and VDC is that CoE is to provide RPA solutions to DGFF and its business partners, while VDC is to provide process automation as a service to DGFF's customers and partners. Nowadays, about 300 robots relieve DGFF with 300 FTEs and these 300 employees can now focus on tasks that add more value (UiPath, 2020k).

2.6.4 Clariant

Clariant – an international chemical company based in Muttenz, Switzerland – operates in over 50 countries. Its Global Business Services centre employs over 800 people around the world and operates with three Clariant's Shared Service Centres. Clariant was looking to automate invoice processing and logistics process management when they found an opportunity with RPA in 2018. Today, Clariant processes over 2,500 invoices with UiPath robots. Overall productivity in the pilot region has increased by 10%. Employees no longer need to manually manage shipping documents, saving 120,000 printouts per year (UiPath, 2020l). Invoices typically come in a variety of formats for processing, emailed as PDF documents or handwritten and scanned. UiPath Robot reads the invoices and updates the record in the SAP system with all the information from the document. Since invoice

processing is intensive and difficult to automate, about 50% of invoices are automated in Clariant's pilot region, with an 80% success rate. Some invoices are still better to be processed manually. Their goal for the future is to achieve a 20% productivity increase by 2022 at Shared Centre Services and scale. Additionally, they plan to test RPA with AI, chatbots, and cognitive technologies (UiPath, 2020l).

2.6.5 Federal Bank

Federal Bank - leading bank in India operating in the private sector - has had extreme growth over the last decade, which has led it to operate with over 1,250 branches across India. The bank has always been open to new technologies. It saw an opportunity for a pilot project in matching data from each of its brands with a personalised ID of an individual customer. Manually, their employees could merge about 200-300 records per day, but with UiPath RPA software, they merge 250 records per hour and the robot can run 24 hours a day (UiPath, 2020m). Their project was completed in half a year, not a year or even more as planned before automation. The quality of the automated processing was an added bonus to the project, as the processed tasks were completed with a 0% error rate. Federal Bank 's RPA journey progressed quickly, they have already automated 15 processes, with 53 planned for automation in the near future (UiPath, 2020m).

3 LABOUR MARKET IN THE AGE OF SOFTWARE ROBOTS

An analysis by McKinsey&Company (2018) indicates that up to 375 million people will need to upgrade their job skills by 2030. The most demanding new skills will be in customer interaction, professionalism in a particular field, caring for and managing people, but a decline will be in data entry, data processing and predictable physical tasks that can be automated by a robot. In emerging economies, demand for educated people at all levels of education will increase, especially at the secondary or lower level, while in advanced economies, educational requirements at the secondary or lower level will decrease and demand for college and higher level expertise will increase (McKinsey&Company, 2018).

In May 2019, Deloitte, the global audit, tax and advisory company, surveyed over 500 executives from various industries and countries. All together from 26 countries across Europe, Asia, America and Africa. The focus of the survey was on their strategies, targeting the intelligent automation field and the impact of it on their workforce (Deloitte, 2019). Highlighted findings (Deloitte, 2019):

- 58% of surveyed executives – they have already started an automation journey; of those, 38% are at the beginning, 12% are implementing, and 8% are already massively scaling it (double the 2018 figure).

- The payback period for automation projects is on average around 15 months (expected payback period), and even less in the scaling stage – around 9 months.
- Over 90% of executives surveyed expect AI to lead to an increase in employee capacity, but 44% said they have not yet calculated how the roles and tasks of their employees will change. Two-thirds of them have not considered that the workforce will need to be retrained or reclassified. This trend is also evident in organisations that are further along on their automation journey - those that are already scaling automation to deliver more value.
- Only 38% of organisations are not retraining their employees whose job descriptions will change as a result of automation.

Deloitte stressed that more skilled workers are needed. 58% of survey respondents who are in the early stages of the automation journey believe they lack skilled workers. One option here is to hire an alternative workforce – it opens up short-term access to skilled workers needed to implement and scale automation at the beginning of the automation journey. These organisations will mostly not be able to successfully implement automation projects without external help (Deloitte, 2019).

Among employees in every company, the fear of losing their jobs to automation is likely to be high. But Deloitte's survey shows different results. 74% of executives surveyed believe their employees support the strategy that relies on intelligent automation. But when organisations are broken down by the level of the automation journey, 32% of respondents from organisations in the early stages say their employees do not support automation, while in organisations further along in the automation journey, only 12% of respondents believe their workforce does not support automation (Deloitte, 2019). The conclusion is that organisations need to involve many employees in automation projects in order to get support from them. Without support, it is almost impossible to successfully implement and scale automation in the organisation (Deloitte, 2019).

Davenport and Kirby (2015) defined automation by three eras, as shown in Figure 10. The figure represents what kind of work has been traditionally done by machines in the last centuries. But their idea is to reframe the situation. "What if, rather than asking the traditional question – What tasks currently performed by humans will soon be done more cheaply and rapidly by machines? – we ask a new one: What new feats might people achieve if they had better-thinking machines to assist them? Instead of seeing work as a zero-sum game with machines taking an ever-greater share, we might see growing possibilities for employment" (Davenport & Kirby, 2015).

Figure 10: Three Eras of Automation

ERA ONE 19th century	**ERA TWO** 20th century	**ERA THREE** 21st century
Machines take away the **dirty and dangerous** – industrial equipment, from looms to the cotton gin, relieves humans of onerous manual labour.	Machines take away the **dull** – automated interfaces, from airline kiosks to call centres, relieve humans of routine service transactions and clerical chores.	Machines take away **decisions** – s intelligent systems, from airfare pricing to IBM's Watson, make better choices than humans, reliable and fast.

Source: Davenport & Kirby (2015).

Because the required skillset of employees will change, Davenport and Kirby (2015) identified 5 employee's paths or areas that can bring higher value to the organisation in the age of automation. These are: create a big picture of a situation that a computer cannot perform, be creative and bring non-traditional ideas on the table, understand how software creates decisions and monitor, modify and improve the results, specialise in something that software does not yet do and update it regularly, and lastly, develop and design the next generation of intelligent software or machines (Davenport & Kirby, 2015).

4 CASE STUDIES OF RPA IN HUMAN RESOURCE DEPARTMENT

In this section, some of the most common processes within the HR department are presented with real life cases of using RPA to automate HR processes. Also, each of the mentioned HR processes is graphically described in the form of two flowcharts:

- As-Is flowchart, which is an example of the process before the implementation of the RPA solution, and
- To-Be flowchart, which is an example of the process after the implementation of the RPA solution.

In the flowcharts, the green area covers the manually processed tasks and the blue area covers the tasks, completed by the RPA robot.

4.1 Employee Onboarding

The employee onboarding process is critical in any organisation because it is important to process all applications quickly and get new employees ready to contribute value to the organisation soon. But the tasks of employee onboarding process are still done manually in most of the companies and are inefficient. Most software solutions for HR departments are often unable to handle the employee onboarding process. When RPA is combined with the

onboarding process, the company can benefit from reducing human error in the onboarding process, improving the efficiency of processing tasks, and protecting data (UiPath, 2020n).

Connie Wanberg (2012) defined the onboarding process as "all formal and informal practices, programmes, and policies enacted or engaged in by an organisation or its agents to facilitate newcomer adjustment" (Wanberg, 2012). The onboarding process activities can be divided into three main categories (Wanberg, 2012):

- Inform – informing new employees through communication channels, preparing and handing over all resources needed for new employees to work under normal conditions, and preparing and conducting mandatory training.
- Welcome – activities designed to meet and introduce new employees to other members of the team and organisation. These activities are conducted during a new employee's first few days.
- Guide – to guide new employees in their first steps in the organisation. Typically, an employee at a higher level is assigned to mentor new employees, and an employee at a similar level is assigned to be a "buddy" to a new employee. A mentor is a more formal adviser, while a buddy is a more informal adviser for a new employee in the first few months.

RPA can be used to automate activities in the onboarding process as well as the selection process for new hires, for example (UiPath, 2020n):

- To verify a candidate's information as part of the selection process
- When using web-based questionnaires to collect candidate data and perform the first stage of selection based on simple criteria
- To upload the company database with the information about new employees.

4.1.1 Real life case of RPA in onboarding process

One of the global IT companies found that the process of recruitment was very costly and had a high error rate as data was copied and pasted manually. It involved a lot of manual work, about 30 minutes of an employee's time, to process a new employee case, not including the time to correct errors and verify (UiPath, 2020n).

By implementing RPA technology, they reduced the processing time by 90%, from 30 minutes to 3-4 minutes per new employee case. They combined attended UiPath Robots with unattended ones and successfully eliminated the time previously spent on reviews and error corrections. With the UiPath RPA solution, the company also achieved oversight of their automated process and was able to expand their RPA capabilities during peak times to handle process all new employee cases (UiPath, 2020n).

4.1.2 Detailed As-Is and To-Be example of onboarding process

Figure 11 is an example of the automation of the onboarding process in practice. The first part of the figure represents the flowchart of the onboarding process before RPA was implemented. It starts with an employee from HR preparing the employment contract that will be signed between the new employee and the company. Another task that might come up in this section of the process is the review of the contract by the company's legal department.

When the employment contract is executed, it is official that the company is getting a new employee. The official onboarding process begins here. The first task is for the employee HR to share all the important information about the new employee with the various departments. This triggers various sub-processes of onboarding such as: Creating an email account, preparing the new employee's laptop, creating a phone extension for the new employee, and creating an access card. After these sub-processes are completed, an employee from HR sends standard informational materials, login codes, and training schedules to the new employee's private email and schedules a team lunch event for the new employee's first day of work.

When a new employee arrives on the first day of work, an HR employee greets the new employee, hands over the laptop, and guides the new employee into his or her department. That same day, an HR employee sends an informative email to all employees briefly introducing the new employee. This gives other employees in the company a push to introduce themselves to the new employee in a simple way, which I believe creates a more welcoming work environment for the new employee.

HR employee sends the new employee a list of all regular and upcoming social events to help them connect with others more quickly. And HR employee gives the new employee a brochure outlining the organisational structure and tips for the first week, and schedules a feedback session after two weeks with the company.

We can see that all the tasks in the first part of *Figure 11* are done manually by HR employees or by employees from other departments. But if we implement RPA technology, most of the tasks in the onboarding process can be automated. We can see that HR employee prepared an employment contract before, but now, the RPA robot can prepare it and send it by email for manual check. It is also possible to send the employment contract directly to the legal department. Once the manual check is complete, the robot can send the reviewed contract to the candidate along with a calendar invitation to sign the contract. The next parts of the robot workflow require a manual trigger from a HR employee when the employment contract is signed by the candidate. This part of the robot's workflow works as a supervised version of automation, since the robot needs human intervention (or, the robot needs a signal). All tasks, from email creation to access card creation, can be done by the robot.

Figure 11: As-Is and To-Be flowcharts of onboarding process
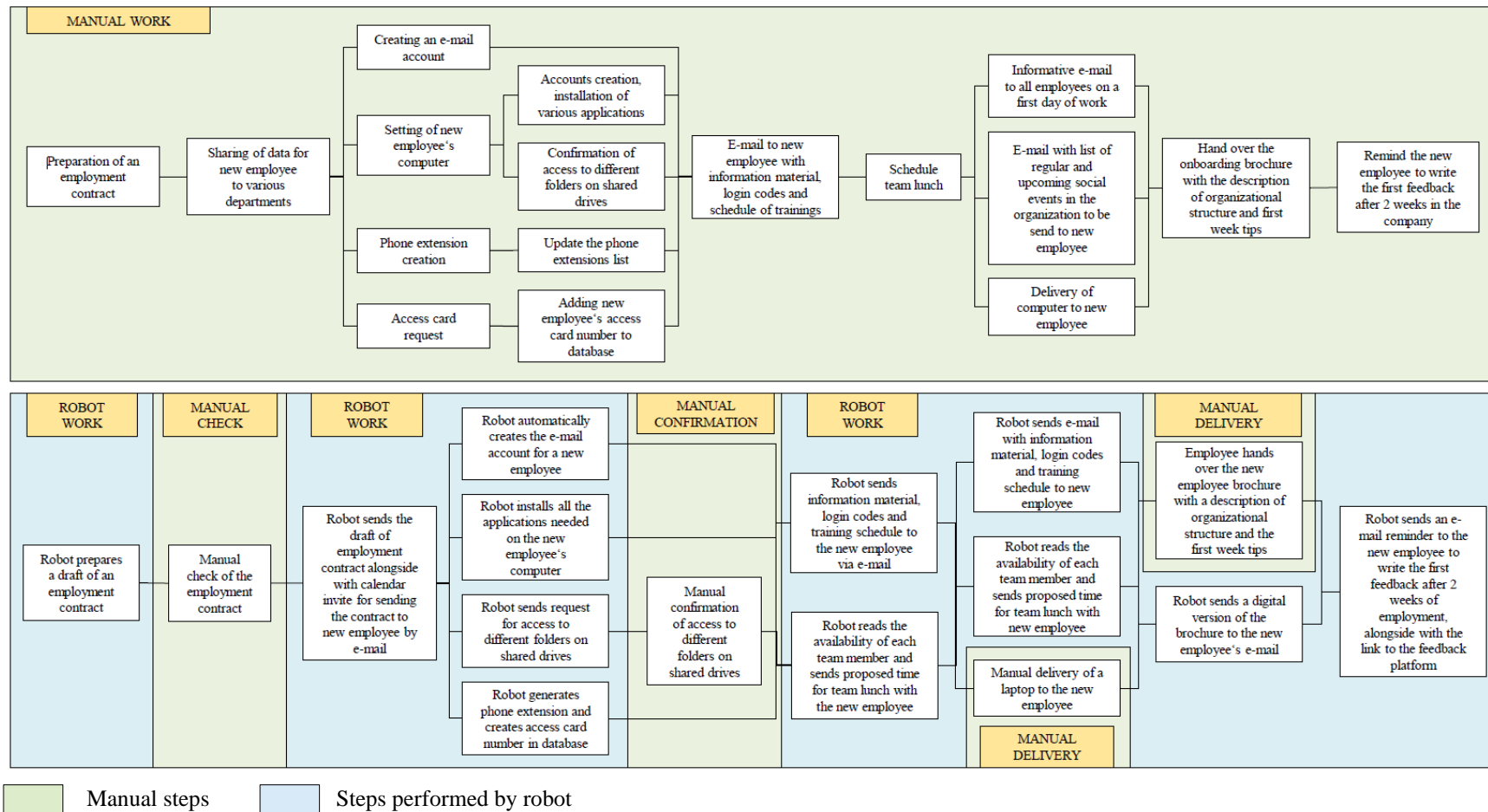
Adapted from Bradt & Vonnegut (2009); Wanberg (2012); Carucci (2018).

What is omitted from the robot's workflow is the manual confirmation of the new employee's access to different folders on shared drives.

This must remain a manual task, as for each main folder on the shared drive, an admin confirms access to the folder. In the next stages of the onboarding process, the robot e-mails different materials to the new employee, checks the availability of the team members for team lunch and schedules it, and sends an informal email to all employees of the company. The only manual tasks left are those that are not in the digital world but need to be handled physically. These are: handling over the work laptop and handing over the brochure to a new employee. The handover of the brochure can also be digitised, but the manual handover is a more pleasant approach for the new employee.

From this example we can summarise that most of the tasks of the onboarding process can be automated by the RPA robot, but what is most important is that the automation has not diminished the experience of the new employee, as there are no fewer human-to-human interactions and the new employee cannot figure out that almost every delivery to them has been automated. This is a great example of how an organisation can automate some of the daily tasks in the HR department and the quality of delivery is improved due to the reduction in the of human error factor.

4.2 Payroll process

The payroll process is the HR process that includes several steps to deliver wages to all employees and remit them to the state. Each pay period, the calculation of hours worked per employee, employee benefits, travel expenses, insurance, taxes, and other relevant factors must be combined to the calculate net wages that is paid to employees (Fit Small Business, 2020).

The payroll process is one of the first processes within the HR department that is typically considered for RPA because it must be done for each pay period – usually monthly, every other week, or weekly. Usually, companies have multiple databases from which information must be extracted and combined to produce payroll. Some companies still deliver the payroll to employees manually and printed on paper, but it can also be easily automated by sending e-mails. In practice, the payroll process can also be outsourced to a company that specialises in HR processes (UiPath, 2020n).

4.2.1 Real life case of RPA in payroll process

A large part of the payroll process is handled in specialised HR service companies that other companies can use to outsource their HR tasks and processes. One HR service providers manually processed over 100,000 pay changes per month, which required full-time six

employees. The pay change process involved numerous departments and two desktop applications, making the process inefficient and awkward (UiPath, 2020n).

With the implementation of the UiPath's RPA solution, the robot now reads all wage change requests that customers email to it. Then, the robot automatically inserts all the necessary data from an email into the SAP system. It only took them seven weeks to implement this solution and they were able to successfully automate 90% of the effort that was previously required to process wage change requests (UiPath, 2020n).

The specialised HR service provider achieved several benefits within payroll processing with the implementation of RPA technology, such as (UiPath, 2020n):

- Return on Investment achieved in just 4 months.
- 60% reduction in payroll costs.
- 0% error rate in processing payroll change events.
- Faster customer response time than before RPA implementation.
- 85% reduction in processing time.

4.2.2 Detailed As-Is and To-Be example of payroll process

Figure 12 presents two flowcharts of the payroll process performed internally - the first part is the As-Is payroll process and the second part is the To-Be example of the same payroll process after the RPA implementation. The payroll process starts with collecting all the data that is an input to the payroll process, from data on attendance at work and training to data on bonuses for each employee. An employee at HR collects all the data and imports it into the payroll software to start the initial payroll process. Some of the data can be imported automatically, while the other data needs to be processed manually due to the unstructured data format. When the initial billing process is complete, a staff member from HR exports the data and opens it with Excel to perform manual calculations. After the manual calculations in Excel, a staff member from HR imports the calculated data back into the billing software for the final billing process. Prior to sending the report from the final billing process, a staff member from HR generates a report on attendance at outside training and outside contractor work during a specific time period. Then these two reports are sent for review to HR manager who confirms them. When the HR confirms the payroll report, an HR pays the online bank, creates and performs the manual journal entry in the general ledger, prints all the pay stubs and e-mails them to the individual employees. And an HR sends all required files to outside institutions for the mandatory reporting process.

Figure 12: As-Is and To-Be flowcharts of payroll process
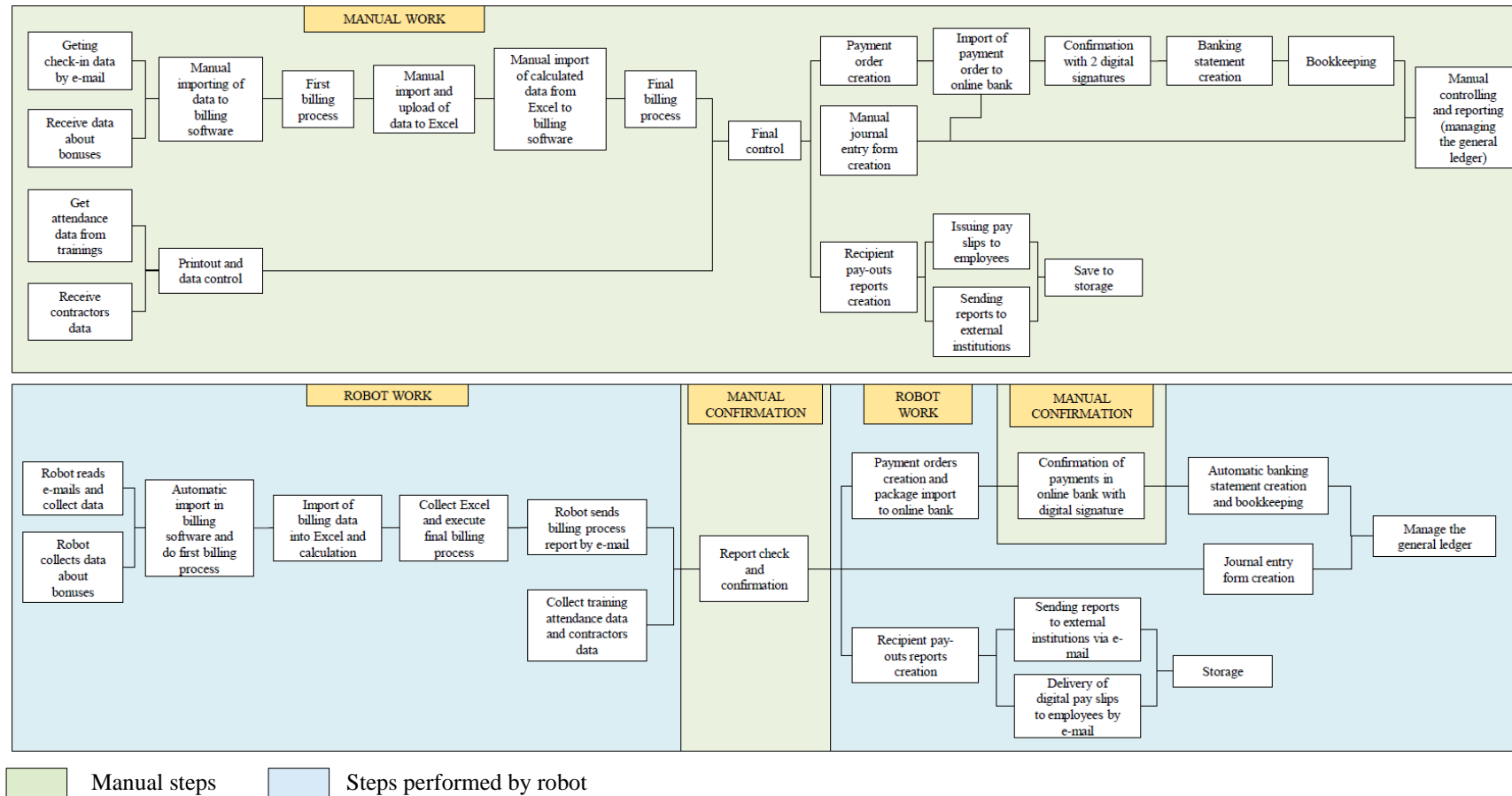
Adapted from SAP (2020a)*; Bragg (2004); Blakely-Gray (2020).*

When the RPA technology is implemented in the organisation and the payroll process is automated (As-Is flowchart), the robot does all the data collection from the email, imports it into the billing software, starts the billing process, does the Excel calculations (the robot can start the macro function in Excel which occurs as a smoother calculation) and does the final billing process. Then the robot uses an email to send the generated report from the final billing along with the collected training attendance and contractors' data.

There are only two tasks that are exempt from automation – report checks and confirmation, and confirming of payments in an online bank with digital signatures (Burns, 2020). These two manual tasks are important to stay manual because we do not leave the entire cycle to the robot and several manual checkpoints must be included in the process before the important decision points of the process. The person responsible for these manual checkpoints is usually a HR manager who receives the email notification from the robot when manual interaction is required. If some errors in the input data accounted for during the development of the robot, the person performing the manual checks would stop the process and eliminate errors or restart the automation process (SAP, 2020a). In the end, the robot also delivers pay slips to individual employees via email and manages general ledger entries.

This example shows the automation of the whole payroll process, where only checkpoints are left for manual handling. There is no manual processing task left for an HR employee which in practice follows in reorganisation of an HR department, with the purpose to focus on more value-added processes; for example: talent development programme, communication via social media, performance management, leadership development, etc. (HR Handbook, 2020).

4.3 Travel and Expense process

Travel and Expense (hereinafter T&E) management is the process of tracking employee expenses from business trips. These expenses can be airfare, meal expenses, and accommodation. T&E management includes (Oracle, 2020):

- Expense Report entry – employees enter and submit their expenses from a business trip.
- Expense Report approval – supervisors approve or reject expense reports.
- Employee expense reimbursement – the organisation reimburses the employee for the cost of a business trip.

Companies use different solutions for T&E management. Small and medium-sized companies usually use manual processing with spreadsheets or simple customised software to record employee expenses. T&E management software is another solution. There are many software providers on the market. Companies have different needs regarding the T&E management process, from the flexibility of the software to the compatibility of the software

with their existing IT infrastructure (Burns, 2020). One of the leading T&E management software on the market is SAP Concur, part of the SAP family products. SAP Concur is a great solution for companies that already use SAP family products and integrating the software is easy. SAP Concur offers solutions on the field of expenses, travel, and invoice processing with integrated budgeting tools, analytics tools, mobile apps, etc. (SAP Concur, 2020).

However, if the company has a customised software for T&E management and implements an RPA solution, automating this process can be very efficient and effective. Processing expense reports with custom made software are usually manual tasks as this software is only meant for tracking expense reports and not for automating expense processing (SPS, 2019).

4.3.1 Real life case of RPA in travel and expense process

Deutsche Bahn, the leading German railway company and an international provider of logistics services, employs over 300,000 people in 130 countries worldwide. In their main country, Germany, they have 200,000 employees, which brings them over 1.4 million business trips per year. To maintain HR processes, they needed transparent and efficient T&E management. They chose RPA to automate their T&E process, from capture to disbursement. With the help of RPA experts, the Swiss Post Solutions, DB successfully reduced the accounting period by 70% and the ROI in only one year (SPS, 2019). They also reduced administrative costs and employee wait times, because before RPA, processing T&E claims was done manually, with physical archiving of documents. Swiss Post Solutions went one step further and developed a smartphone application where each DB employee creates expense claims by uploading their invoices and other receipts. The purpose of the app is to receive input for the automation process in digital form. 92.6% of all claims are now processed without manual intervention, with an average processing time of 60 seconds per claim (SPS, 2019).

4.3.2 Detailed As-Is and To-Be example of travel and expense process

Figure 13 represents one of the basic examples of the T&E process from creation of expenses to payment and reporting. The first workflow shows the process before implementation of RPA technology, where all steps are performed manually by employees, while the second shows the automated process flow. The example of the T&E process starts with expense creation by employees. Each employee creates their own expense report using expense report software and uploads documents as attachments to the expense report. Then the employee's supervisor approves the expenses in the same software. This part of the process is an input section of the T&A process presented. Each week, an HR employee opens the expense report software, enters the date range and the employee ID, and downloads all of the expense reports that have been approved in the selected date range.

Figure 13: As-Is and To-Be flowcharts of travel and expense process

Manual steps | Steps performed by robot
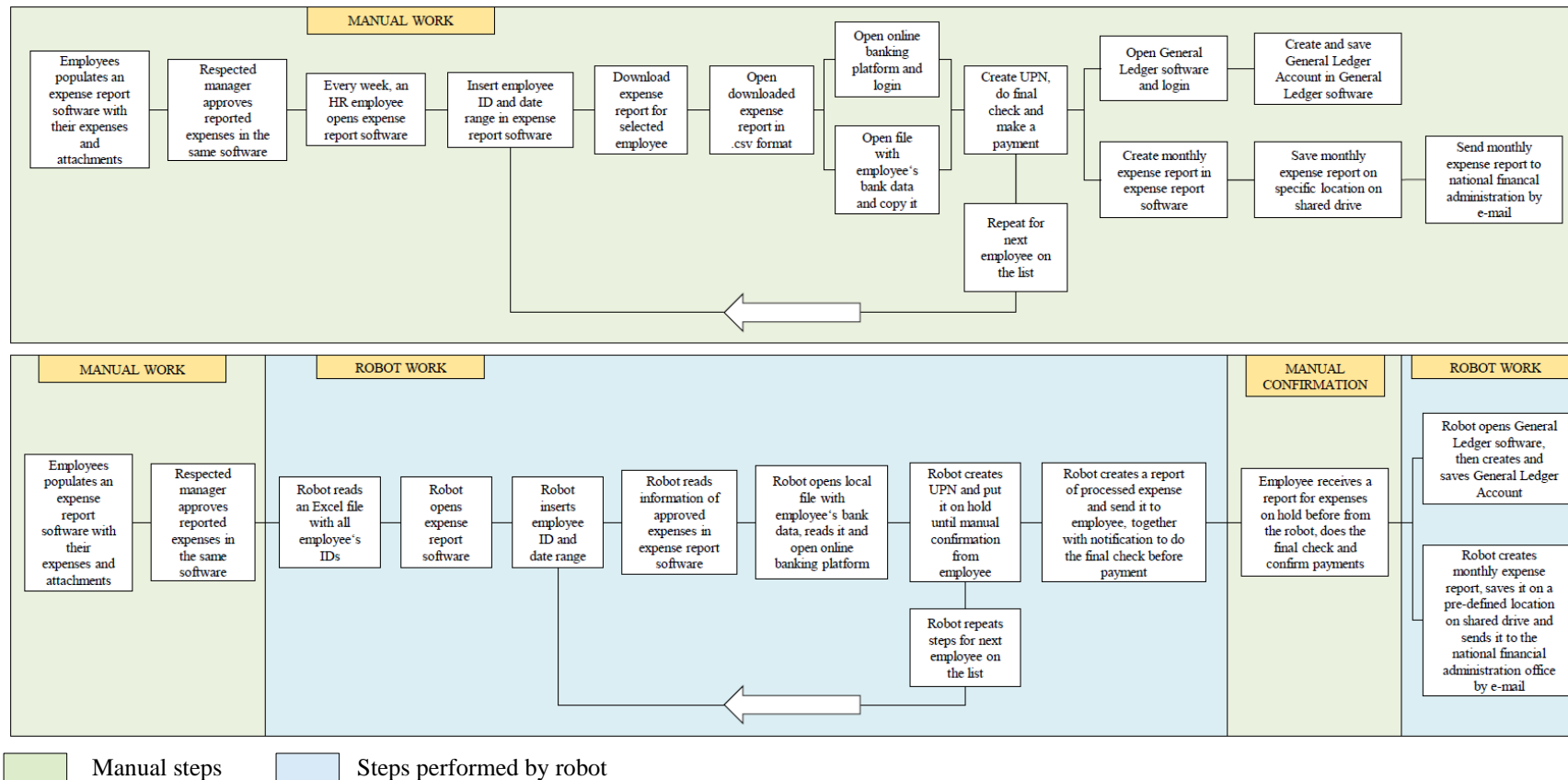
Adapted from Microsoft (2014); Process Street (2020); SAP (2020b).

The next step is to open each of the downloaded expense reports and make a payment on the online banking platform, as was done in the payroll process example. At the end, a HR employee changes the status of the expense report from "confirmed" to "paid" in the expense report software. A HR employee performs the same steps for the next employee ID on the list. When all payments are processed, an employee from HR creates and stores a general ledger account in special software to maintain the general ledger with recent transactions. Once a month, a HR staff member creates the monthly expense report by downloading it from the expense report software, saving it to a special location on a shared drive, and emailing it to National Treasury. This completes the monthly T&E process.

The second part of Figure 13 shows an example of a T&E process after RPA implementation, where the input part of the process remains manual as each employee reports their own outputs. This part of the process can be further simplified by developing a mobile application to generate expense reports and uploading photos of the invoices on the spot; for example: When an employee receives the bill for a meal on a business trip, they immediately take a photo of it and upload it to the mobile app. An RPA robot then processes all confirmed expense claims and generates a report of all payments, which a T&A process owner receives and confirms via email (Microsoft, 2014). When the robot receives the confirmation, it makes all payments on the online banking platform. At the end, the robot also manages the general ledger account and generates a monthly expense report, stores it, and e-mails it to the National Treasury. One improvement to the T&A process that came with the implementation of RPA technology is the selection of the time period in which the robot performs the processing of T&A reports and payments. Before RPA, if employees received payments for their work expenses on a weekly basis, the robot could be set to make payments every day, increasing employee satisfaction with the T&A process.

4.4 Time and Attendance process

Time and Attendance (from now on: T&A) management is focused on tracking employee's work hours (Upland PSA, 2020). In the past, the T&A process was done manually using spreadsheets. This was time-consuming and difficult to manage when the number of employees in the organisation increased. As technology advanced, companies chose one of the following T&A development paths. Either they developed their own T&A management system to track employee attendance at work, or they chose a management solution from the market. For those that developed their own T&A management system, the employee's time records, absence records and vacation reporting are often still reviewed manually on a daily basis. Implementing RPA technology in the HR department allows organisations to automate most T&A management tasks and reducing the costs of manually handled T&A tasks, says Francine Haliva from Kryon, one of the leading RPA solution providers (Haliva, 2018).

RPA in T&A management can help an organisation automate tasks that are currently performed manually and allow automation to scale to perform additional processes in T&A management. RPA in T&A can help with (Nettime Solutions, 2017):

- Enabling tracking of work hours, breaks, overtime, and reviewing schedules through chatbots or with apps on various devices, such as computer, tablet, or mobile phone.
- Analysis and reporting with T&A data, where reports can be based on daily data collected by RPA robots.
- Data migration from custom attendance database to analytics software for reporting. There is no need to abandon the reliable attendance software for manual processing.
- To perform cross-checking of data; for example, to cheque absence reports against employee log times and notify HR of inconsistencies.
- To recommend reallocation of resources.
- To provide alerts when an employee is out of the office or working overtime.

4.4.1 Real life case of RPA in time and attendance process

Walgreens, one of the leading U.S. drugstore chains, is part of the USA Retail Pharmacy Division of Walgreens Boots Alliance and is the first global pharmacy, wellbeing and health enterprise. It was founded in 1901, and currently has over 8 million customer interactions in the U.S. every day – in stores and online combined (Blue Prism, 2018). Walgreens HR shared service centre wanted to improve efficiency and employee experience, which in turn can improve customer experience, so it renewed and updated its updating its core HR and payroll systems with a cloud-based solution. The challenge for Walgreens was the lack of employees when the project took place because they could not hire additional employees and they found RPA as a potential solution to this. They chose Blue Prism as the most suitable RPA solution for their organisation because it is robust and has better IT security capabilities. RPA took over the existing labour-intensive, mundane tasks, freeing employees to work on more value-added tasks in the ongoing project (Blue Prism, 2018).

Walgreens has established a four-step RPA journey for the implementation (Blue Prism, 2018):

- Automate transactional and repeatable processes.
- Constantly seek process optimisation and improvements in Digital Workers' productivity.
- Reorganise team members around more valuable work.
- Evolve and bring Artificial Intelligence to optimise customer and employee experience.

Curt Burghardt, the Vice President of Walgreens' HR Shared Services and Systems (Blue Prism, 2018) shared their approach to RPA. To begin, he wanted to demonstrate the capability of RPA within Walgreens' infrastructure, so he initiated a proof of concept. This

ensured that all team members were on board with RPA before it really took off. He also engaged IT for assistance with personal data and security requirements. RPA was initially used at Walgreens to handle the main attendance management tasks. Since more than two thousand Walgreens employees are absent from work every day due to sick leave, Blue Prism's Digital Worker (synonymous with robot) was developed to automatically load all the necessary data into the system. It is the data about employee absence, including the information whether it is paid or unpaid leave (Blue Prism, 2018). Then, Digital Worker constantly feeds the data between Walgreens' system and claims management software. With this solution, the connection was made between different systems and Walgreens' did not have to make any changes to their existing system. From there, Walgreens' RPA scaled to the entire HR Shared Service Centre and due to the involvement of Walgreens' internal IT department, the RPA solution was scaled to other parts of the Walgreens group. Walgreens' HR Shared Service Centre increased its efficiency by 73% by implementing RPA and continues to expand (Blue Prism, 2018).

4.4.2 Detailed As-Is and To-Be example of time and attendance process

Figure 14 shows an example of a time and attendance process automated with RPA. The company in the example uses two systems for the time tracking process. The first software, also called SoftwareX, is used to calculate employee work hours, post and process leave requests, and process sick leave. The second software is an attendance software where daily check-ins and check-outs are stored using Radio Frequency Identification technology (AB&R, 2020).

Each employee has their own personalised RFID card and performs check-in and check-out at the main entrance of the company building when an employee comes and goes from work. The tasks for HR employees in the time and attendance process described are calculating time worked for each employee from the attendance software and uploading it to SoftwareX, processing confirmed leave requests, and processing digitised sick leave provided by the county's health care providers on their website. Most of the tasks in the described timekeeping process were automated by the RPA robot, only the manual RFID check-in and check-out and the creation of leave requests with confirmation by the employee's supervisor were omitted from the robot's workflow. We can also see that all tasks for HR employees were automated, which can also be described as 100% automation of the work of HR employees on the time tracking process.

Figure 14: As-Is and To-Be flowcharts of time and attendance process

MANUAL WORK

Every employee logs in and out of work daily with an RFID card	Weekly, run the attendance software where all RFID card logs are stored	Download attendance logs for previous period and calculate worked and overwork time for each employee	If any employee forgets to log in or out, send a reminder to employee and his/her superior	Open SoftwareX and insert calculated worked time for each employee

Twice per month, create worked time report, sick report and vacation report by downloading it from SoftwareX and saving to dedicated folder on shared drive

Send reports to chosen managers by e-mail

Open web portal for electronic sick leaves reports and log in	Download all new sick leave reports from the portal	Insert all important information about sick leave in specific form on SoftwareX	Employee creates new vacation request to SoftwareX	Employee's superior confirms vacation request on SoftwareX	If employee's superior forgets to confirm it, an HR employee will send a reminder

MANUAL WORK   **ROBOT WORK**

Every employee logs in and out of work daily with an RFID card	Every day at 10 AM a robot checks if all employees logged in	Robot sends an e-mail reminder to employee and manager in case of the missing login	In case of overtime work or missed log out, a robot sends and e-mail to employee and manager	Once per week, a robot opens attendance software, downloads all attendance data and calculates the time worked per employee	Robot opens SoftwareX and update worked time for each employee

Employee creates new vacation request on SoftwareX	Robot opens SoftwareX and reads all vacation requests	Robot sends an e-mail with relevant data to employee's manager for each vacation request	Respected manager confirms or rejects a vacation request by reponding to an e-mail	Robot receives response from manager by e-mail and update that data to SoftwareX

Twice per month, a robot creates work time, sick leave and vacation report by downloading it from SoftwareX

Robot saves reports in dedicated folder on shared drive and sends them to chosen managers by e-mail

MANUAL WORK

Robot opens web portal for electronic sick leave reports, provided by a healthcare provider in the country.	Robot logs in the web portal and download all new reports	Robot opens all downloaded sick leave reports, reads those and uploads relevant data to SoftwareX

☐ Manual steps   ☐ Steps performed by robot

Adapted from PepsiCo NEA (2015); Spica (2019); WSDoT (2020); Sultana, Enayet & Mouri (2015).

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5 QUALITATIVE RESEARCH: FINDINGS FROM FOUR INTERVIEWS WITH RPA EXPERTS

This chapter presents the main findings from 4 interviews with different RPA experts from around the world. The main purpose of these interviews is to collect the RPA knowledge and know-how from different RPA experts. Only the main findings from the interviews are presented here. The full interviews can be found in *Appendix 2 – Full interviews*. The interviews were conducted through the Hangouts Chat platform in August 2020. Each interview lasted approximately one hour. The interviewees were found in public groups for RPA experts on the LinkedIn platform and through posts on the UiPath Forum.

Before conducting the interviews, I prepared six topics to guide the interview easily. During the interview, I also allowed the interviewees to discuss or even go beyond these topics themselves. With interviews we also address all the research questions of this master's thesis These main topics that we covered with interviews are:

- Introduction – the interviewee introduces his/her career, professional background, and connection with the RPA technology.
- RPA best practices and experiences – the interviewee talks about the past RPA projects he/she has been working on, challenges, which best practices were used in the projects, how to start the RPA project in his/her own company and how to start it when working as a consultant in another company, etc.
- Employees – the interviewee gives own opinion about who should be included in the RPA project, how to motivate employees to embrace automation, and what their experience has been on this topic.
- Robots taking over human jobs – the interviewee presents his/her interactions with other employees and with employees whose process has been automated. Also, the interviewee discusses his/her perspective on this topic, "Robots are taking over human jobs and you are helping to shape this revolution".
- Outsource RPA project or not – the interviewee gives his/her opinion on outsourcing of the RPA implementation project or doing it yourself.
  Successful cases and common obstacles – the interviewee talk about the most successful RPA implementation cases and why they succeeded. We also discussed what the future of the RPA technology is.

5.1 Main findings from interviews

Table 2 summarizes the main findings from all four interviews. The findings are listed by interview topics.

Table 2: Main findings from the interviews conducted

Topic	Main findings from the topic
Introduction	- RPA developer can succeed even without IT background. It is never too late to change career paths. - Patience and passion for RPA technology are important on the personal RPA learning path. - Connect virtually with other RPA experts and use the network of RPA experts to solve obstacles in developing the automation solution.
RPA best practices and experiences	- The RPA team should consist of different roles: RPA developers, Business Analysts, solution architects, leaders, etc. Do not forget to include sales experts in the team. - Give the client deep understanding of RPA technology. Show visual examples of pre-built automations for better understanding. - Run a Proof of Concept or a Pilot project. - Start with a small, but powerful process to automate. - Create a pipeline of potential processes for automation. Use an assessment tool or an Excel spreadsheet to automate the most suitable processes.
Employees	- Get as many profiles from the company on board as possible. Mandatory employees that should be included on RPA projects are managers, end users - executors of the processes and IT. RPA technology gains support when more profiles are included.
Robots taking human jobs	- Establish the "robots are my co-workers" attitude. Take actions to avoid the "robots will take my job" attitude/mindset.
Outsource RPA project or not	- Analyse whether there are enough technical people in the company to do RPA on their own. - Outsource the initial steps of the RPA journey – pilot automation, establishment of the infrastructure and automation framework. - Check if RPA implementation can be a new service you can offer to your customers (after automating your processes).
Successful cases and common obstacles	- If you are not sure about the technology, just try it without any expectation – you will be surprised. - Try to incorporate some ML, AI and other concepts into your automation solutions. Intelligent Process Automation is the future (which is already happening somewhere). - The demand for RPA experts and teams is huge – this is the point where the sales team is important to spread the word about RPA technology and attract potential customers.

Source: own work.

5.2 Introduction of interviewees

The first interviewee is an RPA developer from Johannesburg, South Africa. He is a programmer and works in a local company, providing IT solutions to the telecommunication industry. He started his career as a web developer for two years and a year ago his company initiated an RPA project using the UiPath platform. Initially, they set up the RPA department and invited him to learn about RPA. Their RPA department has successfully automated almost every repetitive process in the company and now they mainly focus on developing automation solutions for their clients. For now, they only have local clients, but they are expanding and looking for potential new clients in India.

Our second interviewee is an RPA expert from Sri Lanka, who received the title of one of the UiPath Most Valuable Players – recognised RPA experts who help others the most by being active on the UiPath forum, writing articles and developing reusable components that others can used in their automation solution. He used the UiPath platform in his previous company because they wanted to partner with UiPath. His learning started at the UiPath Academy and due to his background in programming, he learned it fast. He works as an executive lead of RPA and Solution Architect.

The third interviewee comes from the field of architecture. 6 years ago he moved to IT, when he worked in the national oil company in Serbia. After a couple of years he became the head of IT support for the top management of the company. Then he changed his career path one more time when he started learning programming and became an Android developer, which brought him to his current employer, a Japanese company for the development of IT and Internet of Things (hereafter IoT) solutions for its partners. The interviewee came into contact with RPA and UiPath when their client wanted to try UiPath in addition to developing Android applications. The interviewee participated in the project and liked it.

The last interviewee is an RPA developer from India, also an enthusiast for ML and AI concepts. After completing her Bachelor's degree in Electronics, she started a career in IT, learned 2 programming languages, worked as a freelancer and then switched to RPA. She recently started her own YouTube channel to share videos about different solutions in UiPath, incorporating ML and AI concepts. Her career unexpectedly shifted to RPA. She was chatting with a friend about how she could improve her IT skills and they came up with the idea of looking into RPA. Also, her company had a program to learn RPA where the training was provided by an employee who was passionate about RPA. When the training ended at her company, she wanted to improve her RPA skills and did so at UiPath Academy. RPA has been identified as an opportunity in her company by senior management. Her employer is one of the global IT solution providers with presence in India, USA and Canada. Their largest customer is General Motors. The company focuses on outsourcing and consulting for clients in addition to providing IT solutions. In their industry, they provide Machine Learning solutions, Microsoft support and RPA solutions.

5.3 RPA best practices and experiences

The first interviewee gave good examples of best practices they use when starting a new project; very important to make sure the customer gets enough RPA knowledge to see the opportunity in their business. Their first step is to have their sales team reach out to the customer and present what their RPA team does. If the customer sees the benefits of RPA at that point, they move on to what is called a "deep dive session," where Business Analysts sits down with the customer and looks for potential processes to start with. Sometimes in the first round, there is just a demo version of the automation process so that the customer can get a better idea of what RPA is exactly. After the first round of automation, they plan the schedule for the future.

"Our Business Analysts and RPA developers are the core of our RPA department."

The RPA department of first interviewee consists of:

- Sales team (3 employees).
- Business Analysts (6-7 employees).
- RPA developers (6 employees).
- Solutions Architect (1 employee).
- Project managers (2 employees).
- Lead (1 employee).

If we compare the RPA team/department set up between the first and third interviewee, the third interviewee listed only project manager, team leader and four RPA developers as the RPA department. As it is seen, the RPA department from the first interviewee is in a bigger scale, which does not mean that is more evolved. In the team of third interviewee the team members such as RPA developers and others are also performing part of the job as a Business Analysts, Solution Architects or other RPA team roles. The team organisation depends on the scale and organisational governance.

The approach to clients of the second interviewee is to start with the presentation of what they are doing, then they select client employees (potential RPA developers) to start with the UiPath Academy, and if there is a need, they can also provide workshops for the clients to easily transfer the knowledge. A very good practice is to conduct workshops with people from different companies. The goal of their team is to create a group of UiPath certified people from different companies to start the RPA initiative in their companies.

To figure out where to start automating, we should assess the process using evaluation methods. One option is UiPath Automation Hub, a solution provided by UiPath. It is an automation pipeline management tool that helps an organisation to easily identify automation opportunities. We can engage any employee on Automation Hub where they can

post their own automation idea. The other option is more manual and Excel-based, the so-called Process Assessment Tool. It is an Excel spreadsheet where we can evaluate the suitability of processes for automation. It summarises the processes and to select when choosing where to automate. A template of the Process Assessment Tool is provided by UiPath on the UiPath Academy, at Business Analyst course. The interviewee said that he has seen a few cases where companies have customised provided spreadsheets to fit their needs.

One important thing that emerges from the second interview is the two approaches to RPA: bottom-up and top-down. The first, bottom-up approach, is when we have employees with technical backgrounds learning about RPA through UiPath Academy and discussing automation in the company. The second is the top-down approach, where we have support or even the initiative for RPA from senior management. It is critical to have support from management soon to be successful. The best way combines both approaches.

The RPA journey at the fourth interviewee's company started with automating internal processes and later, two years ago, they automated processes for Schneider Electronics - a well-known player in electronic solutions. Apart from this client, they have a few smaller RPA projects. So far, they have successfully developed an automation solution for Schneider Electronics to employ about 12 robots.

5.4 Employees

"We prefer to develop robots at the client's side, but now with the Corona pandemic the only option is to do it remotely. It is easier to have end users next to you to ask them about the process when we are building the automation flow."

With the first interviewee we talked about who among the client's employees would be relevant to participate in the RPA implementation project. The interviewee pointed out that first and foremost on our side we need: (1) managers of the concerned department - as motivators for other employees, (2) end users - and their knowledge about the process, and (3) IT team - because of accesses and other IT architecture issues. Besides that, any other person is welcome to help spread the good word about RPA in the organisation.

5.5 Outsource RPA project or not

"In general, I think it is better to outsource RPA. But in case that the company has a lot of technically skilled employees, then it is easy to start with RPA on their own."

"It is very important to recognise people that are interested in RPA and have some kind of technical background."

I asked the second interviewee if he thought a company with advanced technical knowledge could successfully implement RPA technology on its own. Based on his experience, the technical knowledge of the employees is not all that matters in an RPA project because a company can have great technical knowledge but not give those employees enough time to learn RPA. Most of the time, the employees selected for RPA still need to do their daily tasks along with the learning courses, which fills up their schedule too much, and usually they postpone the learning courses on UiPath Academy. To avoid this, follow-up sessions can be conducted to discuss their progress.

Another great practise is to host in-person workshops at different locations, which helps them to switch off their mind from the daily work environment for a few hours. Their team helps clients build their own RPA departments and assists them with the RPA implementation. Sometimes their clients want to be part of the development, but one of the main factors is definitely the technical knowledge of employees at the client.

"At first, we started to use RPA internally, but then started to offer RPA solutions to clients. We go to clients and present RPA technology. Sometimes they know about it, sometimes it scares people because they assume that they will lose their jobs due to RPA."

5.6 Robots taking over human jobs and employee's attitude towards RPA technology

The third interviewee said he was happy to receive panicked e-mails from the customer about the occurrence of new bugs with the robots. This means that employees are relying on the robots and not doing the tasks manually when the error occurs. The problem can occur when they would not use the robots and perform tasks as they did before automation. That is where, the whole point and benefit of RPA just goes out the window.

"It is in our nature to be afraid of the change because it is unknown territory and I get it. That is our instinct."

5.7 Successful RPA implementation cases

One case of the real RPA implementation project has been presented by the third interviewee. Over the past two years, their team has automated about 40 processes in various departments for a certain client. This project started with identifying 5 processes in the proof of concept stage. The client selected the list of processes they would like to automate. The list was not realistic as the client did not know what RPA was.

Later, our interviewee's team had a meeting with the client to get on the same page and together they found more realistic processes for automation. What is interesting about this client is that the client still tells them what to automate next. Typically, the interviewee's

team and the client meet online, where the client presents what to automate next. Then the interviewee's team gives feedback on what has been done and what cannot be automated. I think in this case, the customer could get more value out of the RPA project by having the RPA team look for the best RPA opportunities within the company, rather than just giving a clear list of processes that need to be automated next.

The RPA team at third interviewee's organisation has only one customer in terms of RPA. This customer wanted to outsource all development of RPA solutions to them and have no work with them. Robot maintenance is done through a ticketing system, where the client's employee creates the ticket and the team takes care of it. The only problem is the time zone difference - when it is evening in the U.S., it is the middle of the night in Serbia. When errors occur on robots, the customer's administrators look at the problem and try to solve it themselves, otherwise they have to wait until the RPA team is online.

"What is great about this client is that they are aware that we do not create substitutions for their employees, but helpers for them. And it is really great state of mind."

The interviewee pointed out an interesting case in her project. There was a process in the finance department where it took 8 hours a day to produce a report, which is a workload for an employee. The entire process consisted of downloading email attachments, opening those attachments, downloading data from another system, merging data, etc. Now this employee uses the automated process up to 25 times a month. This process alone saves them around $50,000 manually. What is interesting that she did not get fired even though she automated her entire job. She was assigned other tasks that were not appropriate for RPA.

With the fourth interviewee we discussed the main differences between Blue Prism and UiPath are. She pointed out that UiPath is a very new RPA tool compared to Blue Prism, but with BP, if you are stuck in the project, it is hard to get support from BP itself or on the web. Using UiPath you can get a lot of support for your projects when you need it. By having 2 RPA teams in the company, it is important that they decide at the beginning which of their teams will take on a particular project. Sometimes one RPA tool is preferred by a client, or one team is more available than the other. When approaching the new client, their first step is to show examples of the cases they have already automated internally at the company. If these processes are similar to those of the customer, the customer can see how the robot works and sometimes they can automate without PoC.

5.8 The future of RPA

The second interviewee said that the future of RPA is already here. Right now, the Covid situation is helping everyone adapt to automation to reduce the impact of similar unforeseen events on their business.

"RPA is part of Industry 4.0, where the core is on connection. RPA connects things that we already have with the purpose to relieve ourselves of repetitive tasks and we can focus on more creative work."

A very interesting topic from the discussion with the first interviewee was the demand for RPA technology and the supply for RPA developers. He pointed out that he saw some IT companies in his country offering RPA solutions, but he did not see any company looking for RPA solutions themselves. That is why they created the sales team. The most important thing is that there is a great potential with RPA technology in every company, but the technology is unknown to many people. When the sales team talks to potential clients, this is usually the first time the client hears about RPA. The demand does not look high, but there are enough processes to automate for a small RPA team, especially if they only have a few clients. The sales team or at least one sales-oriented person is a must in an RPA team to succeed.

The future of RPA is depended on RPA developers that uses this technology. Fourt interviewee gave me some advice on what RPA developers should look for in their learning journey at the beginning of their RPA career and also for the future. She advises her students not to just rely on UiPath or other RPA platform because it is one tool and over time other tools will come along that will be more in demand. It's better to learn a programming language and cover concepts alongside it, for example ML or AI. These concepts can be applied to multiple tools each time. So to cover all aspects, a developer should cover all three segments: programming languages, tools and concepts.

6 PROCESS ASSESSMENT TOOL

When a company starts with RPA, it is significant for success to evaluate processes to see if they are suitable for automation. This should be done at the beginning of the RPA project and during the implementation project as we scale RPA by automating more processes. One of the most commonly used best practices for process evaluation is an Excel-based Process Assessment Tool. A template of this is also provided by UiPath at the Business Analyst learning path on the UiPath Academy website. The second interviewee also pointed out another option that can be a substitute for Excel-based Process Assessment Tool. It is called UiPath Automation Hub, an automation pipeline management tool, a data-driven tool provided by UiPath, where we can involve everyone in the company to identify and highlight processes that they think are suitable for automation (Lomanto, 2020).

The second interviewee mentions that he has seen many cases where companies have adapted the template Process Assessment Tool, provided by UiPath. The interviewee points out that companies usually customise this template to suit their needs. The process assessment tool is used to get an overview of all the processes in the organisation to find out where in the organisation should be automated, which process will provide the most benefit

ROI, which process is suitable for automation, etc. UiPath Process Assessment Tool is an Excel-based tool and has a predefined scoring for each factor that could affect the automation suitability of the processes. It also gives us estimates of the average effort required to automate low, medium and high complexity processes. In addition, the tool provides the expected effort divided by the RPA roles (UiPath, 2020c).

On the website of UiPath there is available the UiPath Process Assessment Tool template that can be used to evaluate individual processes (UiPath, 2020c). The tool focuses on:

- Process feasibility – to check input types, process stability and application stability.
- Benefits – focusing on the benefits we can derive from automating a process.
- Process complexity – to check if the process can be automated and how complex the automation solution will be.
- Input data – we check what kind of data we have for the process input.

The result tells us if the process is suitable for automation and how much effort it would take to automate it. Furthermore, we can now compare different processes based on data because it gives us the ability to evaluate multiple processes on the same sheet in Excel, where it is even easier to compare them (UiPath, 2020c).

7 DISCUSSION

7.1 Theoretical contributions

In this section, I will connect the theoretical part with the findings from the interviews, position these findings in the literature, and reflect on their significance beyond the studied context.

7.1.1 The Third Industrial Revolution, Industry 4.0 and the positioning of RPA

In the first part of this master's thesis, I mentioned that we had three industrial revolutions and in the last decade there is a trend towards Industry 4.0, which some experts do not really define as the fourth Industrial Revolution. Jeremy Greenwood (1997) pointed out that the Third Industrial Revolution was the digital revolution because we started investing in IT. Each Industrial Revolution represents significant productivity gains, achieved through the introduction of new technologies and ways of working (Roser, 2015). In the Third Industrial Revolution the focus was on computers and automation in manufacturing, but in Industry 4.0 the focus is on connecting different computers and systems together to create higher value. The focus is on the exchange of data between computers and machines, which in practice leads us to smart factories, smart homes, etc. (Marr, 2018).

There are multiple aspects and opinions about where RPA should be placed in the Industrial Revolution. Some experts believe that RPA technology is a part of the Third Industrial Revolution, which talks about computers and automation (Roser, 2015). But Industry 4.0 means the exchange and processing of data with the aim of connecting different computers and sensors into cyber-physical systems and this is also what we can do with RPA in practice (Roser, 2015). The second interviewee believes that "RPA is a part of Industry 4.0, where the core is on connection. RPA connects existing parts of our IT infrastructure with the purpose to relieve ourselves of repetitive tasks and we can focus on more creative work".

From my experience, RPA technology can be defined as part of the Third Industrial Revolution and one of the mosaic pieces of Industry 4.0, as we use it to connect systems that already exist. RPA brings significant productivity improvements and facilitates our daily work, and these features define each Industrial Revolution. RPA technology has a bright future because the technology does not stop at one point, but because contributors are trying to combine RPA with other technologies and trends that are creating the future - for example: chatbots, AI, machine learning, cloud computing, compatibility with different software, etc.

7.1.2 Benefits of RPA projects and hidden opportunities

This subchapter addresses the second research question of the master's thesis: "What are the main benefits of RPA?". There is no simple framework for RPA implementation projects because every organisation is different, there are different ways to start, and employee reactions can be unpredictable. Many think that the most they can get from an RPA implementation is a reduction in operating costs. If organisations focus only on cost savings, they run a higher risk of missing opportunities to improve customer experience and employee satisfaction; one of the examples of this type of benefit is giving employees more time to focus on important, more creative tasks (Lacity & Willcocks, 2016).

Kommera (2019) listed main benefits of RPA for an organisation, which are: (1) overall cost reduction as the average cost of developing and operating the robot is lower than the cost of a full-time employee, (2) speed and productivity are extremely high as the software availability is available 24/7/365, (3) easy scalability and high flexibility, and (4) accuracy and compliance as the robots are 100% accurate, eliminating the cost of human error.

In addition, a company starting the RPA implementation project should be open-minded with a little *think out of the box* culture, some very interesting opportunities can be created next to the obvious benefits of the RPA. For example, a company can completely change the industry by extending RPA to other partners in its supply chain (UiPath, 2019e). Most interviewees revealed another hidden benefit of implementing RPA technology in their organisation – after successfully automating internal processes, they offered RPA implementation as a service to their existing and new customers. This opened up the opportunity for them to expand their organisation into new products and services. I think

there are other opportunities and benefits not mentioned here that companies discovered by a coincidence, lateral thinking or simply a combination of circumstances during or after the RPA implementation.

7.1.3 People adapting to changes because of RPA

The basic perception with any kind of change is that people do not like changes. But Deloitte's survey shows different results for changes associated with RPA implementation. 74% of executives surveyed believe their employees support the strategy, which focuses on intelligent automation. But when organisations are broken down by the level of the automation journey, 32% of respondents from organisations in the early stages say their employees do not support automation, while in organisations further along the automation journey, only 12% of respondents think their workforce does not support automation (Deloitte, 2019). The conclusion is that companies need to involve many employees in automation projects in order to get support from them. Without support, it is almost impossible to successfully implement and scale automation in the organisation (Deloitte, 2019).

Third interviewee presented to us an interesting case. He said that they have a client, who knows the RPA is not the substitution for their employees but is helping them. And it is great state of mind. Third interviewee likes when he receives panic e-mails from the client about an occurrence of new errors with the robots. It means that employees rely on robots and do not perform tasks manually when the error shows. The problem can occur when they would not use robots and perform tasks as they did before the automation. There, the whole point and benefits of RPA just vanish.

The first interviewee told us which of the client's employees we need on our side during RPA implementation projects: (1) managers of the concerned department – as motivators for other employees, (2) end users – and their knowledge of the process, and (3) IT team – because of accesses and other IT architecture issues. Besides, any other person is welcome to help spread a good word about RPA around the organisation.

To conclude, I think that when making changes in the organisation regarding the RPA implementation, it is important to create a great attitude towards RPA technology, include different employees from across the organisation, and clearly define what the RPA changes will entail. It is important to make it clear to the management that RPA is not just an initiative to reduce costs in the organisation, but a way to improve overall processes and bring value creation to a higher level.

7.2 Practical implications

As mentioned at the beginning of this master's thesis, the purpose of this master's thesis is to give a theoretical as well as practical overview of the RPA and to discuss how any company or individual can start their own RPA project. This chapter answers following research questions: "How can RPA be successfully implemented in the organisation? How can small business implement RPA? What are best practices for implementing RPA technology?"

7.2.1 Starting an RPA project

There are many ways in which you can start the RPA project in your company. It varies from case to case, but in general I will divide it into two categories (1) start automating on your own and (2) use an implementation partner.

The easier, usually faster, but also more costly way is to use an implementation partner. Implementation partners are companies or teams that specialise in implementing technical solutions. They typically provide development and later support for the automation solutions they develop, and some can also guide you through the learning stage. That is, they can help employees in the company learn how to develop and maintain automation solutions on their own. We can see that all four interviews included RPA experts who work as implementation partners for their clients. They all started RPA implementation internally in their company. I found that in technically advanced companies, RPA not only brings benefits such as process improvements, cost reductions, etc., but also offers the opportunity to expand the products and services offered by becoming an implementation partner.

In my opinion, using implementation partners is great to get started with RPA if your company has no RPA or IT knowledge internally. However, if you involve external people in your automation project, you can easily lose a lot of opportunities in terms of process understanding and improving your employees' knowledge of digitalisation and automation, which is a big topic nowadays.

On the other hand, the company can start the RPA journey on its own. It is a great opportunity to refresh the technical knowledge of the employees. We also need to keep in mind that the learning path, setting up the RPA department and developing RPA solutions takes time. Selected employees who participate in this project should be excluded from their daily work and focus only on RPA, otherwise the project cannot be successful. As our second interviewee pointed out, it is a good practice to give the selected employees some free time when they are excluded from their daily work environment so that they can learn undisturbed. Our interviewee even goes a step further and hosts learning sessions outside the company, in a different location, where employees have a relaxed environment to learn.

I advise everyone who sees RPA technology as an opportunity for their company to analyse their situation and choose the best solution. I think that the best way is combination of both;

the company uses an implementation partner to start the RPA journey and using best practices right at the beginning, but then scale and maintain RPA themselves.

Figure 15 guides us through the first part of the automation journey, from start to scale. Considering that we have already selected our RPA platform provides, the first step is to prove the value of RPA within a department by automating a few processes, which is usually done by employees who are very enthusiastic about the project and the technology. UiPath points out that the first stage takes up to three months – this varies depending on the company and the situation (Catalli, 2020).

The second stage is the establishment of a Centre of Excellence for RPA where we focus on the development and delivery of multiple automated processes by a team of RPA enthusiasts and experts, who typically implement their solutions within a business unit. This stage can take three to six months and there is a risk of stagnation due to the limitation of the RPA awareness throughout the organisation (Catalli, 2020). The third part is the expansion stage. At this stage, the automation operating model is fully defined which helps the organisation to expand RPA to other business units based on standardised approach (Catalli, 2020).

At the end, we have the scaling stage, where the CoE and its experts can develop, run, and maintain the automations throughout the organisation. At this point, we have a mature automation operating model, the company has up to 10 robots, the CoE can operate itself, and all the project steps from identifying the automation potential to implementing the fully automated solution are standardised (Catalli, 2020).

Figure 15: First part of automation journey – scale stages
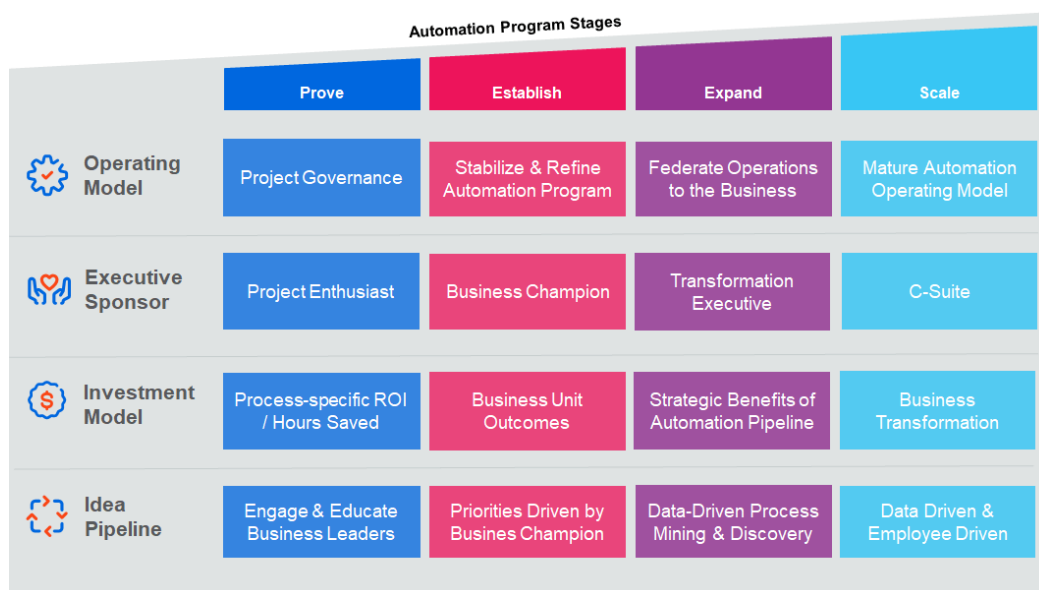
Source: Catalli (2020).

7.2.2 Next steps of RPA journey

With the standard automation operating model established and some robots successfully developed, we can think about what to do next and how to get more value from RPA. Figure 16 shows us the big picture of the automation journey, UiPath's Automation First Maturity Model, where we have a mature automation model. The steps in the model are based on the number of robots in the company and the monetary benefit - ROI - from automation. We need to keep in mind that the scaling stage of RPA in the organisation is not the final stage of automation, but it is time to leverage RPA by transforming the culture of the organisation and changing the default job roles. UiPath envisioned that after scaling RPA across the organisation, we can begin to focus on each individual employee (Catalli, 2020).

"A robot for every person" is UiPath's vision for a transformation stage where everyone in the organisation can be a "Citizen Developer" and have the ability to create and use at least simple attended robots without needing help from the CoE. With the goal of achieving this transformation, the UiPath team has released Studio X. It is a less technical version of the UiPath Studio, designed to be used without programming knowledge. It is simple in creating automation solutions and does not require a long learning path before it can be used. Studio X allows the development of simple attended robots, but complex and unattended robots are still handled by CoE (UiPath, 2021).

By giving every employee access to Studio X and properly managing and supporting its use, a company can reach the transformation stage as all employees are connected to RPA and it transforms the company culture towards automation. At this point, UiPath Automation Hub is set up, another part of the UiPath platform that allows RPA ideas to be collected, prioritised, and an overview of the ideas created by business users. This enables more value to be extracted from the automation pipeline as ideas come from each individual user in the business (UiPath, 2021).

With the combination of Studio X and Automation Hub we can achieve great organisational structure that provides great RPA benefits to the company. Additionally, the centralised Orchestrator gives us the ability to manage and connect CoE projects with civic developers across the organisation (UiPath, 2021).

The final stage of the Automation First Maturity Model in Figure 16 is the Gigabot Economy, which Daniel Dines, CEO and one of the founders of UiPath, explains as "human workers and the digital workforce (software robots) working together, alongside each other, and across borders for even greater business transformation" (UiPath, 2019e). By "across borders", Dines meant that boundaries for robots will not be the boundaries of the company, but robots will span over the entire industry to integrate vertically across the supply chain, for example, and transform a particular industry as we know it today. Digitalisation provides

the competitive advantage over competitors and if competitors do not follow it, they will not have a chance to stay on the market (UiPath, 2019e).

Figure 16: The Automation First Maturity Model by UiPath
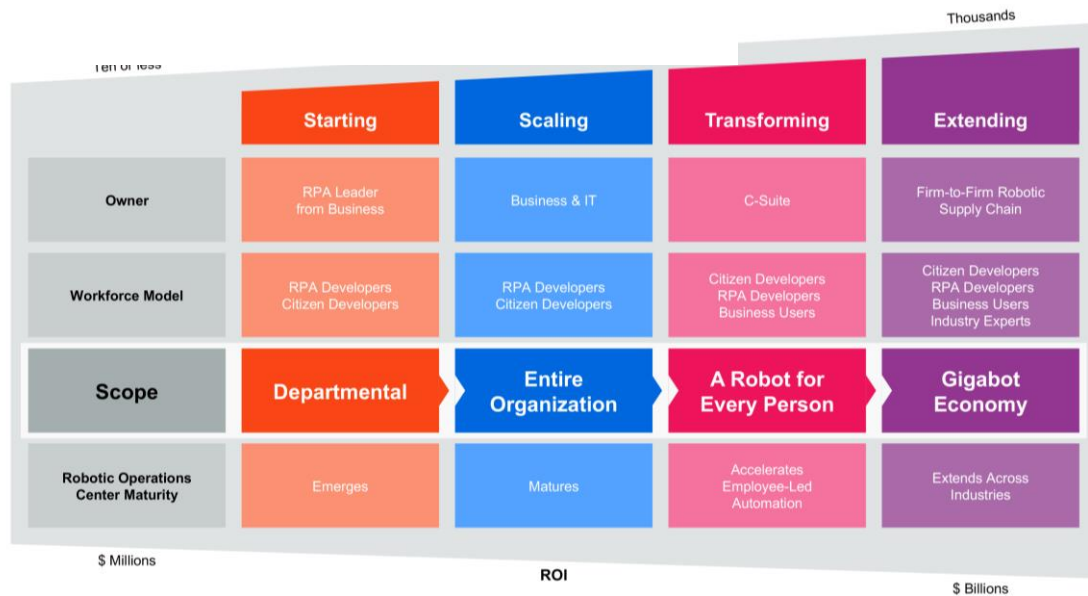
Source: Catalli (2020).

The automation and digitalisation of standard jobs and tasks will change the skills we will need. As described in *Chapter 3 of this master's thesis – Labour market in the age of software robots*, the automation of work tasks will transform traditional work. Davenport and Kirby (2015) mentioned that we need to transform the mindset, from the perspective "where machines are going to perform tasks that we are doing right now and we will lose jobs" to the perspective "where we work side by side with software robots and use those to assist us with tasks, that are not value-added, and we can focus on more creative work which brings better results and upgrades our capabilities".

When we talk about automation, digitalisation and similar topics, we see in practice that transformation is happening fast. In 2019, one of the findings from the Delloite survey (Deloitte, 2019) in Chapter 3 was, "58% of executives surveyed have already started an automation journey; of those, 38% are at the beginning, 12% are implementing, and 8% are already massively scaling (double the number in 2018)". We see that 58% of executives have already started an automation journey, doubling from 2018 to 2019. Moving forward with time to 2020, – our second interview talked about how he can see the Covid pandemic driving the transformation of people's work environments and minds towards automation. The main aspect is that automation could help us in cases of similar unforeseen events in the business.

7.3 Limitations and future research directions

However, the research in my master's thesis had some limitations. One of the main limitations is the lack of scientific papers on RPA, since the technology is not that old and information about it can be found mostly on the websites of RPA platform providers or on reputable forums. I would also like to mention that I have mainly focused on UiPath RPA platform, but much more research can be done when focusing on more of them. Honestly, I was expecting more limitations, but I can point out that I cannot explore all aspects of RPA technology in my master's thesis, and that is why I have added future research directions below.

Future research possibilities and directions that are very interesting to investigate and that I pointed out are directly related to the RPA topic or have been mentioned through this thesis. Below are the most interesting topics that I see as potential for future research:

- *Detailed research on process recognition and evaluation of applicability for automation.* This topic could be presented with a review of best practices offered by different RPA platforms and a questionnaire where the researcher could get direct feedback on different methods and tools for process evaluations.
- *Labour market in times of automation and how employees' view automation of their previous workload.* It would be interesting to dive deep into the psychological and ethnic aspects of automation. This can be done through interviews or questionnaires with people who have already been exposed to automation and those who have not.
- *Overview of the market of RPA implementation partners around the world.* During my research and work with RPA technology, I noticed that RPA implementation partners are mainly found in developing countries. It would be interesting to see if this hypothesis is valid and what the reasons are.
- *Comparison of implementation best practices used by developers from different RPA platforms.* While looking for interview candidates, an RPA expert from the Europe region mentioned that it would be great to see how best practices differ when developers use different RPA platforms.
- *Comparing current and future/expected job skills.* There is already a lot of literature on these topics. It would be great to do a research on future job skills where researchers could focus on companies or fields where jobs are easiest to automate. I suggest a research on what a finance and accounting department will look like.
- *The most popular technologies that companies are using to improve "white collar" productivity and reduce workload.* In the past I have been working on productivity improvements in manufacturing, but if we are talking about RPA technology, this is a tool to improve white collar productivity.
- *Intelligent Process Automation – does it exist yet?* Interviews and a literature review on intelligent Process Automation could be interesting because I think they will show how companies are already using intelligent automation of their business processes. Besides,

researchers could also present use cases of real processes that can be automated with intelligent process automation and what is the added value compared to RPA.

CONCLUSION

This thesis has shown how any organisation or individual can expand their horizons by making the changes that RPA technology brings in a part of their life. To start, all it takes is one very enthusiastic individual in an open-minded organisation and they can kick-start the RPA journey. In the past I received advice from one of the UiPath specialists that it is important not to think too much when approaching RPA, but to just test it, and through this process you gain enthusiasm. The fourth interviewee talked about guidance for RPA enthusiasts. She said that it is important to focus on learning at least one programming language, then learn tools and expand your horizons by incorporating some concepts, like ML or similar. This way, when technology changes over time, you can adapt faster and get the most out of it. RPA can also be a great career starter for people who are not IT specialists as it does not require specific programming skills.

After this thesis, it is clear that RPA is very useful in any organisation as it helps to get rid of most of the manual, repetitive and low value-adding tasks, which helps employees to focus on more creative and value-adding tasks. The end result of robotic process automation in organisations and society can be a positive attitude towards the respected technology that focuses on collaboration between humans and software robots. The technology, that helps us with our unwanted daily tasks, improves the use of our data, connects various existing software together without making changes to the initial IT infrastructure, and is also a great way to reduce costs, is a way to set the organisational strategy towards a more digitalised enterprise.

RPA technology certainly has the future in the 21st century if we focus on pushing the boundaries of RPA towards intelligent robotic process automation. With this will come the transformation of the way we work today, as it came from each Industrial Revolution in the past. At first, people find it hard to accept change, but as time goes by, we cannot even imagine our lives without these technological improvements and innovations. We can look forward to the challenges that RPA and intelligent automation will bring with it.

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APPENDICES

Appendix 1 – povzetek v slovenskem jeziku

Namen te magistrske naloge je posamezniku približati tehnologijo robotske avtomatizacije poslovnih procesov. S pomočjo naloge posameznik pridobi pregled nad RPA tehnologijo; razlago kaj je RPA tehnologija, prednosti in spremembe, ki jih prinaša, pregled vodilnih rešitev na RPA trgu ter podrobna predstavitev celostne UiPath rešitve in procesov v kadrovski službi, ki so primerni za avtomatizacijo v večini podjetij. Poleg tega so predstavljeni še eni od najbolj odmevnih primerov implementacije RPA tehnologije, kjer vidimo kaj vse je možno doseči z RPA tehnologijo, v zadnjem delu pa so predstavljene še ugotovitve iz intervjujev z različnimi poznavalci RPA tehnologije iz celega sveta.

Iz naloge je razvidno, da je RPA tehnologija zelo uporabna v kakršnem koli podjetju na način, da avtomatiziramo ročne, ponovljive naloge z nizko dodano vrednostjo, kar zaposlene razbremeni in jim omogoči, da se lahko osredotočijo na zahtevnejše naloge in izzive, ki prinesejo večjo vrednost podjetju ter v večini primerov zahtevajo tudi več kreativnosti od posameznika. Pri tem pa je potrebno biti pozoren na posameznikov odziv na avtomatizacijo, saj marsikdo lahko to razume kot zamenjavo za njegovo dosedanje delo in posledično izgubo službe. Iz intervjujev pa je razvidno, da temu v praksi ni tako.

RPA tehnologija nam je lahko v pomoč pri digitalni preobrazbi podjetja in spremembi mišljenja v podjetju, saj lahko s sodelovanjem med posameznikom in programskim robotom dosežemo, da vsak posameznik začne prepoznavati procese, ki so primerni za avtomatizacijo. Poleg tega, da nam RPA tehnologija pomaga pri uresničitvi digitalne strategije podjetja, nam prinese še razne dodatne izboljšave in prednosti, kot so: zmanjšanje operativnih stroškov, izboljšanje kvalitete opravljanja ponovljivega rutinskega dela, razbremenitev zaposlenih in s tem možnost osredotočenja na bolj kreativne naloge, izboljšave pri uporabi podatkov v podjetju in vzpostavitev povezave med različnimi že obstoječimi računalniškimi programi in podatkovnimi bazami brez spremembe računalniške infrastrukture v podjetju.

RPA tehnologija zagotovo ima prihodnost v 21. stoletju, saj ponudniki te tehnologije v svoje rešitve že vključujejo moderne koncepte, kot sta računalniško učenje in umetna inteligenca. S tem se vse bolj približujemo inteligentni avtomatizaciji poslovnih procesov. Transformacija trenutnega delovnega vsakdana posameznika ni nekaj novega, kar prinaša RPA tehnologija, saj nam v preteklosti vsaka od industrijskih revolucij potrdi, da je bil na začetku res odpor do vsake nove tehnologije, a čez čas smo izboljšave začeli uporabljati vsakodnevno in si življenja brez njih ne moremo več predstavljati. S tem ne smemo pozabiti, da analize potrebnih znanj v službi prihodnosti izpostavljajo sposobnosti in izkušnje iz digitalizacij ter avtomatizacij procesov kot ene od vodilnih prednosti na trgu dela.

Appendix 2 – full interviews

The whole interviews are presented in this appendix. First header is the aim I as an interviewer focused on while leading the interview. *Italic text* presents questions and sentences by interviewer.

First interviewee
Introduction of interviewee
- *Tell me about yourself and your connection to RPA.*
  - o I come from Johannesburg, South Africa. I am RPA Developer, also working on architecture setup, robot administration with deployment, and deployment of the UiPath Orchestrator. 80% of my work is building robots, using mostly UiPath, sometimes also Microsoft Power platform (MS Power Automation and Apps), Python automation and VBA script. My background is programming, started working as a web developer (for 2 years), started working in RPA industry from last August. Before UiPath I developed some macros in Excel for reporting.
- *How did you start with RPA and UiPath?*
  - o My company has initiated RPA, created RPA department and I started learning UiPath because they thought that I am the right fit for being RPA developer.
- *Does your company developing RPA solutions for own purposes, or do you offer RPA solutions to the customers (being RPA implementation partner?*
  - o A bit of both. The reason I said that is that we automated our HR processes internally, almost every repetitive process, but also, we focus mostly on doing automation for our clients.
- *Who are your clients?*
  - o Mostly companies in our country (South Africa). Some of our clients are international companies that are based here in South Africa but have branches in Australia or other countries. Furthermore, we made partnership with some Indian companies where projects are in initial stage. Now we are reviewing client's processes and focusing on how to make it work when developers are sitting in South Africa while developing automation solutions for processes that are in India.
- *Tell me more about your company. Is the development of RPA solutions your core business or is it something else?*
  - o My company is local company (in top 5-10 on the market) here in Johannesburg that offers IT solutions to telecommunication industry, additionally we are offering RPA solutions (by our RPA department).
  - o Next to that we are Microsoft and Amazon Web Service (AWS) partners and offering their solution to the customers. We are also focused on mobile app

development and offering solutions as outsourcing of our technician and developers for telecommunication companies.

RPA best practices

- *Tell me about your RPA department – what are the roles of team members? How do you approach customers?*
    - We have fully developed RPA department, with following roles:
        - Sales team (3 employees)
        - Business Analysts (6-7 employees)
        - RPA developers (6 employees)
        - Solutions Architect (1 employee)
        - Project managers (2 employees)
        - Lead (1 employee)
    - Our Business Analysts and RPA developers are the core of the RPA department.
    - First step is when our sales team approach potential clients, telling them what we are doing, and asking them if they have any processes that would like us to automate. If there is a match, our Business Analysts (BA) are going to meet with them at so called "Deep dive session". In Deep dive session, our BA meets with the end users (person who does the work manually) and maybe the manager that those end users report to. They sit down with them, tell them what they do, and BA analyse if the process is fit for the automation – like if the process is repetitive, does not have a lot of business decisions in it, etc.
- *Are you using Proof of Concept or Pilot project at the beginning of client's RPA journey?*
    - Yes, after the Deep dive session, after we decide that the process is fit for automation, we will build a robot and create the video to present it to the customer. Sometimes we also present the live demo robot to the customer.
    - Then they decide if they want to continue with the project and we have another session, focusing on deeper understanding of system and pulling out reports from it. After that they go to project of RPA development.
- *Do you use some tools/spreadsheets for process evaluation to find the processes for automation by more structured way?*
    - Yes, we use that kind of documents. We took those documentation from UiPath, additionally built some of our documents to help us analysed the processes and see if those qualify for the automation or not.
- *Do you use Task Capture (tool for capturing processes, provided by UiPath) and to automatically prepare big part of PDD (Process Design Document)?*
    - No, but two weeks ago we had Zoom meeting with UiPath about it. Part of our BAs went deeper in it and eventually we will start using it if we find it useful.

- *Next to development of RPA solutions and maintaining those for customers, do you also teach customers the development of RPA and guiding them through creation of Centre of Excellence (RPA department) in their company?*
  - We do offer automation end-to-end solution; building robots and maintaining those, only things that we teach them is the training after the implementation of RPA solution, so they understand how to work with the robots and to run them. But we do not teach them to build the robots on their own.
- *How many customers do you have?*
  - We have 6 robots that are already running, for each client one robot, and we also have 10 clients where we already did PoC, but because of Covid lockdown we cannot start with next steps of RPA implementation.
  - We offer two options for the customers because to run the Orchestrator you need the license. The first option is that we run robots for you at our premises and you do not need to pay the license for Orchestrator. The second option is to run only attended robots locally by client employees.
- *Are there any issues with the security in the first option where clients have constant network connection with you?*
  - Yes, the security with the client's data can be an issue in this option, but we signed contracts with them to protect their data. We use logs of what was done for each client and send monthly reports to the clients. They can also login to the Orchestrator and view logs. We make sure that it is as safe as possible in given situation.

Employees - Robots taking human jobs
- *Did you ever had the situation at the client's side that employees did not want to participate on RPA project because they thought that the robot will take their job?*
  - We have not had the situation like that, but one time when we sat down with customer's employees to show them the presentation about RPA. At the end of the day, I spoke with one of the employees and she was concerned that she might lose the job. She was happy to participate but also scared that we were bringing in the robots that could take jobs.
  - But so far, we had good response from the employees.
- *By your opinion, who needs to be included on RPA projects at client's side?*
  - Manager of the department where we automate the process because that person is responsible to communicate with the employees that we are bringing robots (and explain to them that robots will not take their jobs).
  - End users who have most experience with the process and will help you map out all possibilities of the process.
  - IT team because we need accesses, VPN to their systems, creating user account for the robot.
  - I think that everyone should be included, especially when you come to the company and present RPA. Because people might come to you later and say

that they also have the process that they think is suitable for automation and you guys should investigate it. Invite as many people from the company as possible.

Outsource RPA or not
- *What do you think about outsourcing RPA projects? You said that you only develop and implement solutions for the customers, without teaching them to develop on their own. Do you think it is better to outsource RPA projects or to teach employees because employees know the processes better?*
    - o Processes differ. It is good idea to teach everyone how to automate – look at UiPath. They offer StudioX version which is meant for end users to automate.
    - o But there are processes that needs the developer. Example: in SAP system where there are no selectors, you need to think outside of the box, which can be only performed by well-educated and experienced developers. Also, to have advanced RPA team is better when bringing macros, some Python or AI to create better process automation.
- *Let us say, that in one company (which did not implement any RPA solutions yet) there is a person who just read about RPA technology and gained big interest on RPA topic. Is it possible to start with the RPA initiative and RPA journey for that company just by this employee? Is it better to find RPA implementation partner or maybe start with UiPath Academy and try RPA technology on their own?*
    - o Yes, I think it is possible, especially when someone has proper training, some technical background, and enough decision power in the company. When all that is a match, the only big problem left is that you need to have enough time to learn and try RPA. We need to consider that employee still has all the workload from before to do on daily basis.

Successful RPA cases and common obstacles
- *What is most common obstacle when working with clients on RPA implementation project?*
    - o Problems differ:
        - One time we had customer that used legacy systems that we really struggle to automate.
        - A lot of times happened those clients wanted to run robot on the same laptop that their employees are working on which usually brings to the problems. We tell them that it is better to have different machine (e.g., laptop) where only robot is running on. When the robot is running in attended mode there is a lot of mistakes when running the robot by employees. For example: Excel is still open when the employee starts the robot and then the robot breaks. It leads to situation when employees do not want to use robots anymore and they perform automated tasks on their own.

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- ▪ Another challenge appears when we first time demonstrate what RPA technology is and client is so excited and expect that robot can make decisions on their own. But robots are not that smart.
- ▪ Sometimes there is a challenge with IT teams. They need to open accounts for the robot and give you the access to their system - some companies have crazy security systems.
- *Do you usually develop robots remotely or at the client's side?*
  - o We prefer to develop robots at the client's side, but now with Corona pandemic the only option is to do it remotely. It is easier to have end users next to you to ask them about the process when we are building the automation flow. But now we try to have meeting to ask as many questions as possible and having video calls with end users. Sometimes it is also the problem that client is too far away, and we need to do it remotely.
- *What is your relationship with UiPath support team?*
  - o UiPath support team and their local team here in Johannesburg are very supportive and offer help when we need it. They sit down with us and help us with the approach to different processes, licenses or any other issues that occurs.
- *Do you think that there are enough RPA developers in your time to fulfil all the demand for RPA projects?*
  - o I have seen some IT companies in our country that started to offer RPA solutions on their websites, but I have not seen companies that are looking for RPA. That is why our company started to employ salespeople to go out to clients and promote RPA. The demand is not high, but there is a lot of opportunities and for a small RPA team there is enough processes to automate just when having few clients.

Second interviewee
Introduction of interviewee
- – *Tell me about yourself and your connection to RPA.*
  - o I am one of UiPath MVPs, promoted in March, currently working at Boundaryless Automation as an executive lead of RPA and solution architect.
  - o Started with UiPath in previous company. They wanted to get UiPath partnership, and I started with UiPath Academy. I did not have any idea what RPA is. I had interest in basic robots and ML. With my background from programming, I learnt very fast on UiPath Academy and got certifications. Later, I was very interested in RPA, and I was involved in UiPath Community via Forum, tried to help people with pain points. I gained knowledge of what others are doing with RPA; application of RPA depending on industry, different approaches. While doing that I also wrote some articles (e.g., processing time section). Furthermore, I created some reusable components

for UiPath platform and posted it on UiPath Market place. I also applied for UiPath MVP (Most Valuable Player) program.

- o We are UiPath business partners. At first, we started to use RPA internally, but then started to offer RPA solutions to clients. We go to clients and present RPA technology. Sometimes they know about it, sometimes it scares people because they assume that they will lose their jobs due to RPA.

– *Are you RPA implementation partner or you develop RPA solutions only for your company?*
- o We are developing UiPath solutions for the clients, teaching them about RPA technology, helping them building their automation capabilities and we also support them through the RPA implementation.
- o It differs from the client; some of them want to be part of RPA development in their company but is also very important to look at the level of their technical knowledge. Sometimes clients handle just part of the RPA implementation project (e.g., some development, support and maintenance).

RPA best practices
- *How do you approach the client with RPA?*
    - o First, we do a run up session; what RPA is and what are different trends in the World, what UiPath is doing, what our company is doing and our connection with UiPath. At that time, they get high level understanding. Then we ask technical people at the section to go to UiPath Academy and do initial training. We also do the workshops from time to time for the clients.
    - o Another approach is to perform workshop sessions with people from different companies. Our goal is to have a group of UiPath certified people, and they start the initiative in the company.
    - o It is very important to recognise people that are interested in RPA and have some kind of technical background.
    - o For businesspeople we do sessions with StudioX, Task Capture and other components of UiPath platform because we talk their language and is easily to connect with them. Usually, we do not go to the clients and start with StudioX right away because it will scare them. StudioX is usually presented after first run up session when we present UiPath tools. In case that there still is no interested people we invite them to Automation Hub, where they can post ideas of what to automate in the company.
- *Are you using Proof of Concept or Pilot project at the beginning of client's RPA journey?*
    - o It depends on the client. If they want to see what RPA and UiPath can do, then we go for PoC. But if they are confident enough in RPA, we go strictly to the RPA project.
- *Can a company with good technical knowledge start with RPA on their own or do they need RPA implementation partner?*

o Depends on how much time will they allocate to the learning. In some companies they assign people to go through the RPA courses. But most of the time they also need to perform their usual work and they postpone RPA learning courses on UiPath Academy. To avoid that, we do follow up sessions to discuss their progress. We take time for them, invite them to some workshops that are on different locations so they can be separated from their daily work environment and be focused only on RPA.

- *Do you use some tools/spreadsheets for process evaluation to find the processes for automation by more structured way?*
    o We need to have some kind of assessment tool. Client can have Automation Hub which is a companywide approach of assessing and recognising processes for automation. Other way is to have assessment tool which is Excel based; one template for Excel based assessment tool is also presented at UiPath Academy courses and available for download. I saw that companies use Excel based assessment tool and rearrange it to their needs.

Employees - Robots taking human jobs

- *What is the best way to motivate client's employees about RPA? By your experience, are there some concerns by employees that robots will take their jobs? Was that a negative impact on employee cooperation on the project?*
    o Every time we go for a client meeting, our focus is to not scare them with RPA. What we usually do is the preparation part for the meeting. We try to understand the client's business, what do they do. Let us say it is a delivery company and we will meet with their finance team. We try to understand their processes in the finance and depending on that we can build a use case – some kind of a demo, maybe on an invoice process. This demo is used as a support to the presentation. We describe RPA to them, tell them what UiPath is doing, what we are doing and then we show demo robot. It gives them better understanding of RPA because those are finance people, not programmers.
    o Later we also do 2 hours session to understand their processes and after that we present them our view. One of the common outcomes is that we present them what RPA can do additionally to their processes to improve those.

Outsource RPA or not

- *Let us say, that in one company (which did not implement any RPA solutions yet) there is a person who just read about RPA technology and gained big interest on RPA topic. Is it possible to start with the RPA initiative and RPA journey for that company just by this employee? Is it better to find RPA implementation partner or maybe start with UiPath Academy and try RPA technology on their own?*
    o It depends. When approaching RPA there are two approaches: first from top down and second from bottom up. Both should work.

- o Bottom up: we are guys in the company, we have technical background and a lot of tasks that can be automated. We can get to UiPath Academy and learn about it. Then we can pass that message to the management and do simple demo. Then the management can go to next level. If we want to do something like that, it is important to get the approval from the management.
  - o Top down: for RPA implementation, management support is very crucial because without it, RPA implementation cannot be successful.
  - o The best way is combination of both.
- *By your experiences, was there any time that company came to UiPath and wanted to start with RPA or is it more common that UiPath and its implementation partners are approaching clients?*
  - o There are companies that come to implementation partners with their problem to automate. But only if they have some background from automation. Otherwise, UiPath and its implementation partners approach clients and present them RPA.
- *Do companies want to outsource all parts of RPA implementation to implementation partners?*
  - o In most cases they want to outsource it to implementation partner because they do not have expertise to cover it. But there are scenarios, mostly in large companies that have technical and businesspeople, where both together can automate processes with RPA. The problem appears when there are technical people but no businesspeople (with understanding of RPA) that could cover Business Analysts and similar positions on the RPA journey.

Successful RPA cases and common obstacles
- *What kind of people do you need for Centre of Excellence? Tell me what kind of employee profile we need for a small Centre of Excellence department.*
  - o It is hard to do only with one guy. If we have one very technical guy, we still lack a business side. We need additional person who is a Business Analyst – person with deep knowledge of business processes and with at least a basic understanding of RPA technology. For the start, two employees from different background are enough. Later, we can add other RPA roles to the CoE (architects and others).
- *What is the future of RPA? Demand for it, intelligent RPA, artificial intelligence or what?*
  - o We can say that the future is already here. Especially with the Covid situation we look at what can be automated. Now people are thinking more and more about what they can automate because of those unpredicted events and processes must run, otherwise there are loses.

- *Do you think that there are enough RPA developers in your time to fulfil all the demand for RPA projects?*
    - Trend now is the hyperautomation. We do not focus only on the part of development but also on things that need to be done before the automation and after the automation.
    - Now the trend is not just Robotic Process Automation, but Hyperautomation and that is where all other aspects come – machine learning, AI and other.
- *What do you think: is RPA part of the fourth industrial revolution/Industry 4.0?*
    - When the computers were initially introduced people though that it is some magical thing. But they got used to work with new technology. The same happened when mobile phones were introduced. And RPA is something like that.
    - Currently, we have a lot of software systems that are not connected. We can say that RPA is part of Industry 4.0, where the core is on connection. RPA connects things that we already have with the purpose to relieve ourselves of repetitive tasks and we can focus on more creative work.

Third interviewee
Introduction of interviewee
- *Tell me about yourself and your connection to RPA.*
    - My background is architecture, I worked for a couple of years as an architect. Then I changed my career to IT (that is going on for 6 years now), working as IT support in national oil company in Serbia. After few years I became head of IT support of top management in the company. In the meantime, I started to think that I want more, so I started another career transition. I started to learn programming and aimed to become Android developer. I was working as a freelance android developer and later got the job in Japanese company, present also in Europe and USA. Our company is developing IT and IoT (Internet of Things) solutions to its partners.
    - When I started to work in this company, I did team lead of android app development for one client. Next to android app they also offered us to automate their processes with UiPath. I did not know about UiPath before. I participated on this project, and I really liked it.
    - I learnt about UiPath by myself, went through the UiPath Academy and was constantly connected to the Forum.
    - In past two years we automated around 40 processes for different departments in our client's company (HR, finance and purchasing). It was hard at the beginning because client wanted us to automate 5 processes as Proof of Concept. They chose which processes they want to have for the PoC, but the problem was that they came with some crazy, unrealistic ideas because they did not know exactly what RPA is and how it works. Later we had meeting

sessions, we talked about what RPA really is and I suggested them to automate some repetitive tasks, such as scraping data from the web, and collecting data from their databases and preparing reports. At that point they realised what RPA really is and what it can do.
- o After a week, they sent us new documentation for other processes, which were now more relevant for RPA.

RPA best practices
- – *Did you also prepare PDD and SDD documentation for the client? What kind of process documentation did they send you?*
   - o I prepared documentation for some processes. At first the documentation was poor. The client did not know what is important and they sent us everything. Also, we needed to learn how to do it. Later, we agreed with the client to use Task Capture from UiPath to send them the documentation of the process because the client is located in USA and we are here in Serbia, and personal visit to the client is not the option. Another problem was time difference.
   - o After those initial processes were automated (PoC) they calculated their Return on Investment (ROI) and saw that it was very successful. We had another session to talk more serious about automation. We talked about Orchestrator, virtual machines… It took a while (one month) to do calculations again because Orchestrator is around 9,000 €. When they figured out their budget, we started the real project. We remade those PoC processes and run them on virtual machines with Orchestrator. Also, in the meantime I wrote development standards, reusable components and how we should do backups.
- – *How do you know which process is next for automation?*
   - o They are telling us what to automate next. Usually, we have online meetings with them, and they are telling us what they want to automate. Then we tell them what is possible and what not. Together we decide which process will go into development. Later, their employees create the process documentation with Task Capture software and send us to automate. When we receive the documentation, we go through it and prepare estimation of the development and testing costs. We also decide on the timeline for the project.
- – *Who is in your team?*
   - o The project manager, who is also part of the team, is present at the client side in USA. His role is to connect us with the client.
   - o Me, as a team lead of developers here in Serbia.
   - o Four developers that are also located here in Serbia.
- – *Does your client also have RPA team, or they want to outsource everything to you?*
   - o At that point, they want to outsource everything to us because they do not have any RPA people. We gave them recommendation for the Orchestrator and Infrastructure courses on the Academy. I think the client took a year to

complete the course about Orchestrator, even if it is very short one – not more than 15 hours.

– *What about maintenance of the robots in the production?*

    o We are maintaining robots. We use Jira as a ticketing system, where client create the ticket and we investigate it. In case of problems with Orchestrator, I am responsible for it. The only problem is time difference when there is evening in USA and here in Serbia is night. Only in that situation, their administrators will look at the problem.

Employees - Robots taking human jobs

– *How did their employees react to automation?*

    o Our client made sure at the beginning of the project that nobody is going to be fired.

    o There was one process in finance department where the employee told us that she takes 8 hours per day for some reporting. The whole process was downloading some email attachments, opening it, downloading data from one other system, merging data, etc. Now she uses that automated process up to 25 times per month. This process alone brings them around 50,000$ savings annually. It is interested that she did not get fired although that we automated her whole job. She got other work and processes that were not suitable for RPA.

    o What is great about this client is that they are aware that we do not create substitutions for their employees, but helpers for them. And it is really great state of mind. Also, I really like seeing panic emails from them which means that they are relying in the process. I can see that employees are not performing tasks manually when robot send error message. The problem can occur when they do not use robots and start to perform tasks as they did before the automation.

– *What is your perspective on Robots taking human jobs?*

    o In the long term, there will be some transformation of jobs. New jobs will appear. We will have to employ RPA admin, whose job will be only to manage robots. Also, other jobs will appear.

    o To be honest, I do not want to believe that RPA will cause so much unemployment at the World. I think that at the end it is up to each company's manager. For example, my client will assign other tasks to those employees whose processes were automated.

    o At the meantime, there is a big demand for RPA developers and other specialists.

    o It is in our nature to be afraid of the change because it is unknown territory and I get it. That is our instinct.

Fourth interviewee

Introduction of interviewee

– *Tell me about yourself and your connection to RPA.*

  o My background is electronics. After bachelor I started with IT, started to learn 2 programming languages, worked as a freelancer, and then shifted to RPA.

  o When I applied to different jobs in companies, certificates were not enough to get the job. You always need to prove yourself that you can handle tasks.

  o On a side, I always tried to help people and voluntarily teaching others with knowledge that I have. It also helps you learn things faster when you teach others about it. I learnt a lot because each person has different perspective on a case and takes different approach.

  o Recently I also started with YouTube channel to share videos about different solutions with UiPath, also including ML and AI in it.

  o I started with RPA very randomly; when one of my friends started with Machine Learning we talked how I can improve my IT knowledge. He came up with the RPA and UiPath which at that time became interesting topic. After that I did a research what it is, started to learn and I automated small tasks (updating payroll, automating reports). Furthermore, at that time there was a program in my organization to learn RPA. These trainings were provided by my organization, by an employee who was very enthusiastic about RPA, but later moved to another project and I continued with learning by myself.

    ▪ At that time, I did not want to stop learning about RPA, so I gathered a group of people and we continued learning with the help of UiPath Academy. We took challenges, worked together and improved our RPA knowledge.

  o When learning about UiPath and RPA technology, the UiPath Forum and community is very helpful because when you have some challenges with the automation solution you just post the question, and everybody help you to find the solution.

RPA best practices

– *How did your organization start with RPA?*

  o RPA technology in my company was recognised as an opportunity by management. My employer is one of the global IT solution providers, present in India, US, and Canada. They saw RPA as a potential for automation of business processes more than development automation. We automated onboarding in HR, in finance department payroll and a lot of other business processes.

  o My organization is mainly focused on providing outsourcing and consultancy for clients, and next to that providing IT solutions. Our biggest client is

General Motors. In my branch we provide Machine Learning solutions, Microsoft support and RPA solutions.

- o RPA journey in our organization started with the automation of internal processes and two years ago we started with the development of automation solutions for Schneider Electrics (hereinafter SE), well known player in electronic solutions sector. Besides SE we have some smaller RPA projects. Until now we developed automation solutions for SE to keep busy around 12 robots. I think that we are still in the initial stage of RPA journey because right now we are finishing with automation project for SE and are at the beginning of searching for new potential client.

- *How big is the RPA team at your organization?*
  - o In our organization we have two RPA teams; I am in the UiPath RPA team, and we also have Blue Prism RPA team. Each team has 5 members. My team consists of 4 developers/BA, and we also have one architect.

- *How do you start with the automation of new process?*
  - o It all starts with the segregation of the requirements which BA or architect investigates. We come up with the requirements to be clear what we are going to do in the upcoming stages and based on that we come up with the PDD. Then our solution architect comes up with the SDD which has more technicalities, technical requirements, timeline of the project, planning of the resources… When it comes to us (developers) we are more concerned about development on the project, good practices, exception handling, issues, framework, etc.
  - o My role is then to be developer, to build the robot, implementing best practices and connecting the robot with the databases (local or cloud-based databases). And when all this is done, I also prepare white paper documentation for the project.

- *How do you develop your process automation solutions? Do you do it from the office, from home, at the client side, with the help of VPN and RDS?*
  - o If the client is from the same time zone and close then we prefer to go to the client, but when the client is for example from US then we are working remotely. It is always easier if you are present at the client.

- *Who is responsible for the sale of RPA service and solution at your organization?*
  - o We have separate sales and marketing team who deals with the discussions regarding RPA.

- *Are you also present at the initial discussions at the client?*
  - o Not at the first meeting. Usually, the architect is present there because of the assurance. Architect is responsible for the solution at the end and needs to discuss with the client what the focus of the project is. Architect provides technicality to those meetings to not going into wrong direction with the client.

- *Timeline of the project?*

- o After initial discussion and getting requirement, we start with the Proof of Concept; at least small PoC is needed to check the requirements and that the client understands if we will be able to manage specified task.
- – *How do you choose what kind of process is ok for PoC?*
  - o It depends on case to case. If for example the project is about the reading pdf files with the robot, then we will take some demo pdf files with OCR activities and manipulate with the outcome data in a way that the client is going to see the results of automation. With the PoC we want to make sure to cover all requirements from the client, but to put just enough effort to do it. After we show it to the client and the client is happy with it, we agree to start with the development of specified automated solution.
- – *Do you also teach the client how to develop and maintain the robots or not?*
  - o It depends. In case that the team and employees at the client have technical understanding then it will be easy to teach them about RPA. But otherwise, we have support team available all the time for maintenance of developed RPA solutions which is based on agreements of long-term maintenance support. It is discussed at the initial meeting of the project.
- – *What is the learning path for the client's employee?*
  - o It depends on each person. If the person is technically strong and maybe a bit familiar already with the UiPath then we will not need to teach the person from the beginning. In that case we explain requirements, probabilities to go wrong and how to deal with it.
  - o In case that the person does not have that knowledge, we recommend UiPath Academy, certification and to try it to gain some knowledge.
- – *How do you choose who will get the project; UiPath team or Blue Prism team?*
  - o For example, for Schneider we have two projects; one with UiPath and one with Blue Prism, because Schneider became partner with Blue Prism, and it is their preferred RPA tool to use.
  - o But in case that in the future there would be a client that prefers one other RPA tool, then we would learn that tool because our team has very strong technical knowledge and we could deliver required solution within a short amount of time.
  - o We decide at the beginning who will get the certain project; BP team or UiPath team, and we also do not mix our teams together because each team is specific.
- – *How is the approach from the Blue Prism team different from your UiPath team?*
  - o In terms of documentation, it is the same, but the time you take to implement the Blue Prism project is very different from the UiPath. UiPath compared to Blue Prism is very new. With the Blue Prism the biggest problem is when you are stuck at some point it is hard to get any support from internet or Blue Prism to success with it. When using UiPath there is a significant difference because you can get support from UiPath Forum or UiPath itself very fast.

- o UiPath is always feasible when you try to apply something that is not that standard or maybe actions are not yet created.
- – *Does the client tell you which process is going to be in the focus for automation or do you do the overview and evaluation of the processes?*
  - o From my experiences, I cannot tell you how it would normally be because we only had few clients. But when we approach new client, it is important to keep in mind those business processes that we already automated in our organization and can be also found in most of the companies. For us it is easier to start automating client's processes that are like ours because client can see those robots already in action without having any PoC; we just show them our cases.

Employees - Robots taking human jobs
- – *How do you motivate client employees when they know that they could lose their jobs after automation will be fully integrated in their company?*
  - o I cannot comment on that directly because yes, in that time when changes happen some less skilled people will lose jobs but in terms of economy, I believe that RPA will help a lot of companies to not go out of business when there will be even more unemployment. Evolutions mostly hit people that do not have many skills.
  - o I will just give one example that I saw when I did a research about document understanding. I read in an article that when we have low skilled jobs where picking of the data from invoices, just for extracting the data from those documents, we have significant factor which is human error. Human mistakes will result in a lot of loss for the company. If we can just automate those processes using document understanding of UiPath, which is using machine learning and artificial intelligence capabilities, this could save a lot of time. I read that it could save in one organization around 27 hours per day, which translates to around 78 thousand dollars in one organization per year. Additionally, the organization gets benefit with the data accuracy because human errors are not included. Evolutions is going to directly involve those people that are connected to automated processes, but on the other side there will be more high skilled jobs. Evolution usually takes more time and change of generation. Now a lot of graduate students learn about UiPath and RPA, like personal upskilling with Excel in the past.

Successful RPA cases and common obstacles
- – *How to personally upskill RPA and IT knowledge as a developer?*
  - o I advise to every of my students to not just rely on UiPath because it is a tool and over some time there will be other tools for sure which will be more in demand. I advise that everyone searches for new knowledge and tries to learn some programming language. Next to that it is also great to learn some

concepts; for example, machine learning or artificial intelligence because concepts can be applied every time to multiple tools. So, to enlighten your career you need to be focus on all three segments – programming languages, tools, and concepts.

Outsource RPA or not

– *Do you think that it is better for the company to outsource RPA or start with it in-house?*
    o It depends. In general, I think it is better to outsource RPA.
    o For example, if we take marketing company with a lot of branches and without any very technical employees, it is better for the company to focus on core job and do not get lost in learning and development of RPA. So, the development will take less time and the solution is going to be more accurate. Furthermore, it is also better to choose business decisions which brings you results faster and in that case the outsourcing will bring benefits from investment faster.
    o But in case that the company has a lot of technically skilled employees, then it is easy to start with RPA on their own.