RPA AND THE FUTURE OF WORKFORCE

Adrian-Mihai ZAHARIA-RĂDULESCU[1]
Cătalin Liviu PRICOP[2]
Darko SHULESKI[3]
Anton Cristian IOAN[4]

ABSTRACT

Automation is one of the keywords of today's business landscape as it can decrease cost, increase accuracy, decrease execution time while increasing security and confidentiality of business operations and by doing that increasing efficiency and providing a boost for higher business performance. The automation landscape is composed of several verticals and one that is a hot topic today is Robotic Process Automation (RPA) as it can support rapid automation of enterprise business processes. This paper aims to present the automation landscape, what RPA is and how can this approach help companies to increase their performance and maintain their competitive advantage in a highly dynamic economic environment. The challenges and the risks of RPA adoption are also presented in the paper. The research done by the authors is both theoretical and literature review and combines knowledge from different areas. Examples of how RPA can be used are presented in this paper to facilitate the understanding of the subject. RPA is a key component for the workforce of the future when humans and robots will work together for the benefit of society.

KEYWORDS: *RPA, workforce automation, performance management.*

JEL CLASSIFICATION: *M15, O33*

1. INTRODUCTION

The fast pace environment is forcing organizations to reinvent themselves quicker than a decade ago with shorten time to market for new products and services. Today organizations need to increase revenue while keeping expenses under control. Automation is an answer to all these and is a powerful approach for any organization nowadays with more and more companies investing huge bugets on this approach.

According to a worldwide study (McKinsey Global Institute, 2017) the technical automation potential is concentrated in countries with larger population and higher paying jobs as it is shown below in Fig 1. We are talking about Japan, India, China, United States, France, Germany, Italy, Spain and United Kingdom. According to the same study there are a couple of factors that can accelerate or decrease the adoption of automation technology ranging from technical feasibility, labor market dynamics to economic benefits and regulatory and social acceptance.

We are not going to explore all the automation tracks available but we will consider for this study only the automation related to the information space. There are different levels of automation in the information age with desktop automation being the oldest one and Artificial Intelligence the newest one.
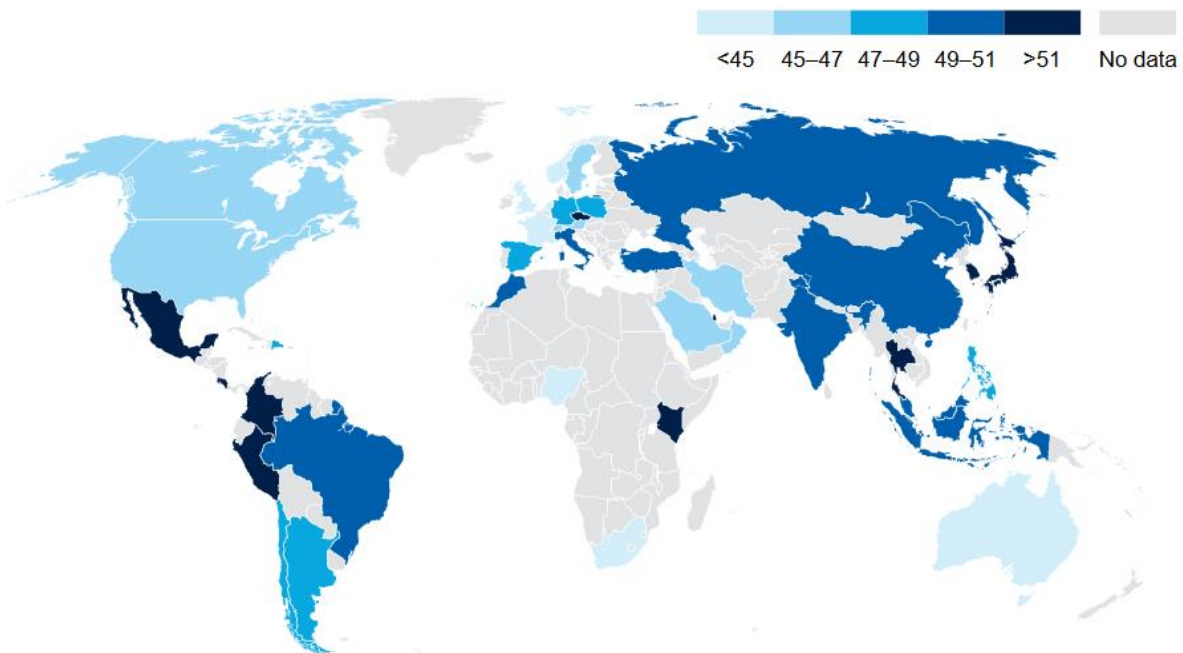
---

[1] Bucharest University of Economic Studies, Romania, mihai.zaharia@gmail.com
[2] Bucharest University of Economic Studies, Romania, catalinpricop86@gmail.com
[3] Bucharest University of Economic Studies, Romania, darko.shuleski@man.ase.ro
[4] Bucharest University of Economic Studies, Romania, antonyc@gmail.com

Figure 1. Employee weighted overall percentage of activities that can be automated
Source: McKinsey Global Institute (2017)

With desktop automation the focus is on automating a set of mouse and keyboard interactions between a human operator and a computer using a scripting language and macros. Screen grabing and paying attention to errors by human interfering in the execution process is mandatory. Desktop automation runs on user's workstation so it doesn't have its own privileges and user access security level is the one used by desktop automation as well. Needless to say that one user that closes the workstation or allows an operating system update will lead to an execution failure of the scripts. The focus is on automating one role and specific process tasks and decreasing costs and also human errors. Managing different automations made this way is a difficult process. However desktop automation is the first step to perform and understand what activities of one human employee can be automated within a short time and a good exercise prior moving to RPA.

RPA is the next automation level where virtual workers are built, repetitive human tasks are emulated. Instead of having human employees interacting with multiple different applications RPA uses software robots that will execute the same thing. It is not limited to keyboard and mouse interactions, is based on rules, runs from its own context so it can have its own security level, doesn't reside on a workstation but can be scaled from a server and can easily be integrated with other systems. The focus is on automating larger processes, not role specific, decreasing costs, decreasing execution time and increasing quality.

Artificial Intelligence is the highest level because it allows an organization to build cognitive experiences focused on solving specific problems and digital assistants that emulates a person that can carry a conversation and perform complex tasks. Allows automation of decision making based on discovered patterns, thus making Artificial Intelligence to have its focus on increasing value rather than reducing costs. Artificial Intelligence augments an organization core expertise and knowledge. The foundation for this is having a large amount of data that is well structured and sanitized and of course well defined questions. Data scientists will analyze data, extract features, build models to identify patterns while business owners based on the foundings of the first ones will define the rule for further automation. Implementing Artificial Intelligence is a long process that requires specific roles and knowledge in the organization thus being harder to implement than RPA.

2. WHAT IS AND HOW RPA WORKS?

According to the Institute for Robotic Process Automation & Artificial Intelligence „Robotic process automation (RPA) is the application of technology that allows employees in a company to configure computer software or a "robot" to capture and interpret existing applications for processing a transaction, manipulating data, triggering responses and communicating with other digital systems"(Institute for Robotic Process Automation and Artificial Intelligence, 2017).
While industrial robots assure higher performance in production facilities so does RPA can provide an increased performance for repetitive work performed by human employees because it's able to mimic the steps of a rules-based process as long as the process is clear and the rules are well defined.
An example of a manual vs RPA implemented process is shown below.
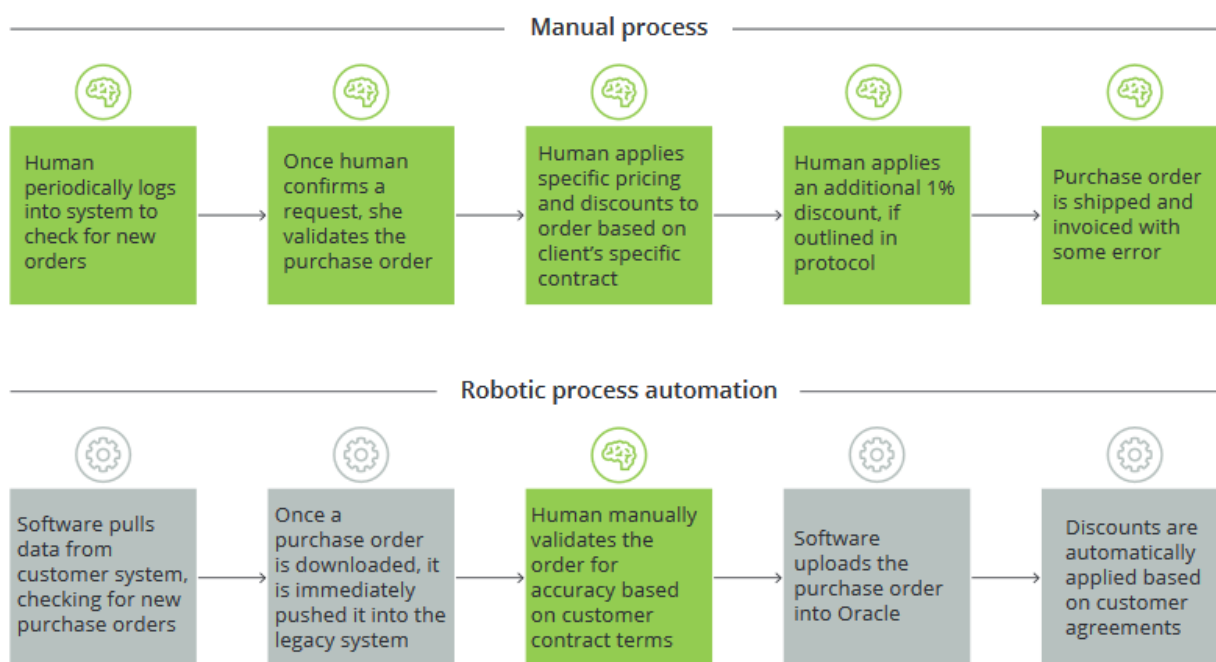
Figure 2. Manual versus RPA implemented process
Source: Schatsky D. (2016)

One can easily identify the clerical, repetitive work that doesn't need reasoning or creativity to be performed. RPA can do repetitive tasks more quickly and accurately than human employees. RPA doesn't become tired. It's easy to scale up and down and by doing this allows people to focus on other tasks requiring creativity, reasoning, emotional intelligence and interaction with other people. It allows human employees to focus on maximizing the added value they provide to their organization. As RPA is gaining more traction in the market so does its impact on organization performance and the future of workforce.
RPA is deployed in the IT infrastructure, can be easily controlled by IT and managed together with the other enterprise solutions used by an organization thus providing a higher availability.
RPA is basically defined through three elements: developer tools, a robot controller and the software robots. Developer tools are used to define the tasks that are executed step by step by to perform a business process, the tasks that mimics human employee operations. Tasks that are composed of:
- decision instructions like if, else conditions, do while;
- screen grabbing;
- data grabbing;

- monitoring folders for new files or changes in the files;
- running commands in the console;
- opening business applications and navigating through their menus;
- setting timers and delays;
- sending emails;
- editing text;
- computed variables;
- user defined events and many more;

A simple screen from such a tool can be seen in the screenshot below (figure 3).
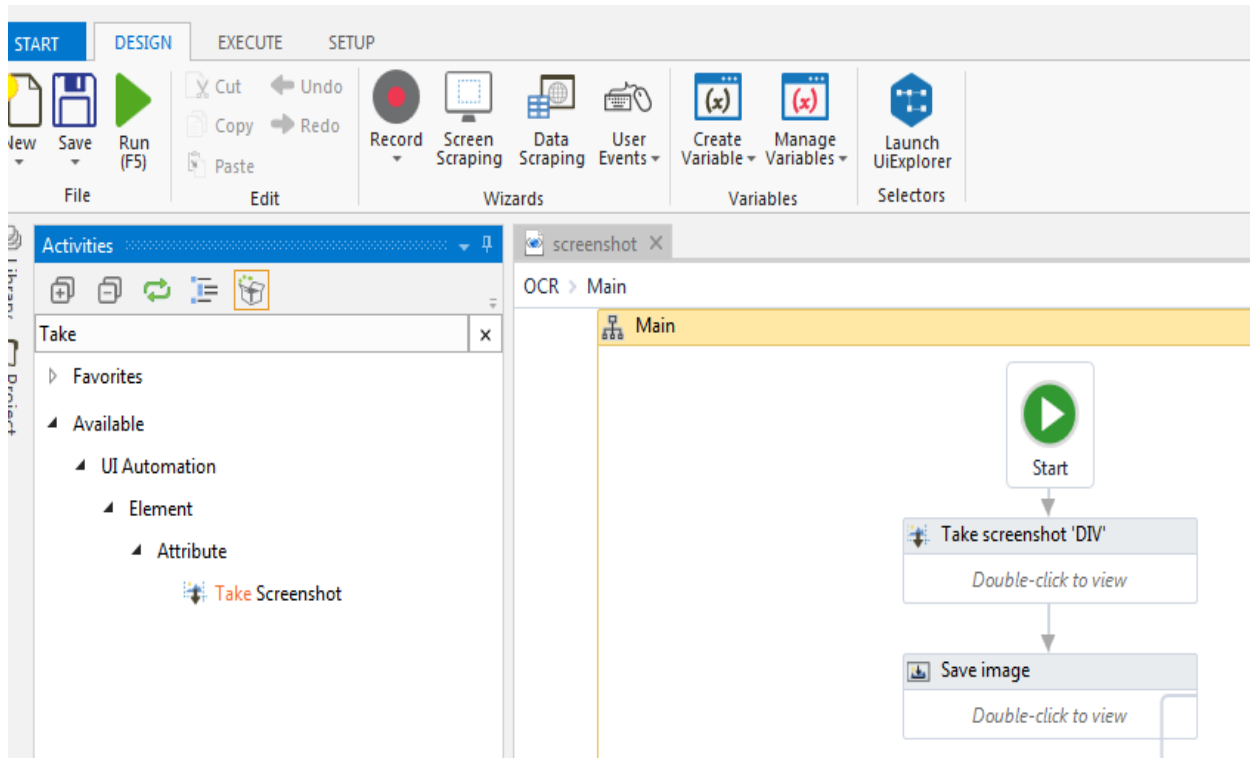
Figure 3. Design of a very simple process in a developer studio
*Source:* UiPath forum (2017)

As shown in (Lowes P., 2016) the robot controller has three important roles:
- main repository for jobs defined, this way assuring version control so it's easy to track down changes in the processes such as a process exception handling. It also stores their execution context: access security level, role, user and password in an encrypted manner which increases the overall security and confidentiality;
- assigning roles and permissions that allow human employees to review and change jobs, run robots or simply scale the robot instances up or down based on workload available;
- assigning jobs to single or multiple robots and monitor their execution.

Software robots are the instances of automation, they run the transactions defined in the jobs, they interact with the business applications in the various steps of the business process that is automated. They represent together the robotic workforce that can run independently from user accounts and user security level and increase both security and confidentiality.

3. RPA JOURNEY

RPA journey has 5 stages: PoC (Proof of Concept), RPA assessment, RPA implementation, production roll-out and maintenance as shown in the diagram below.
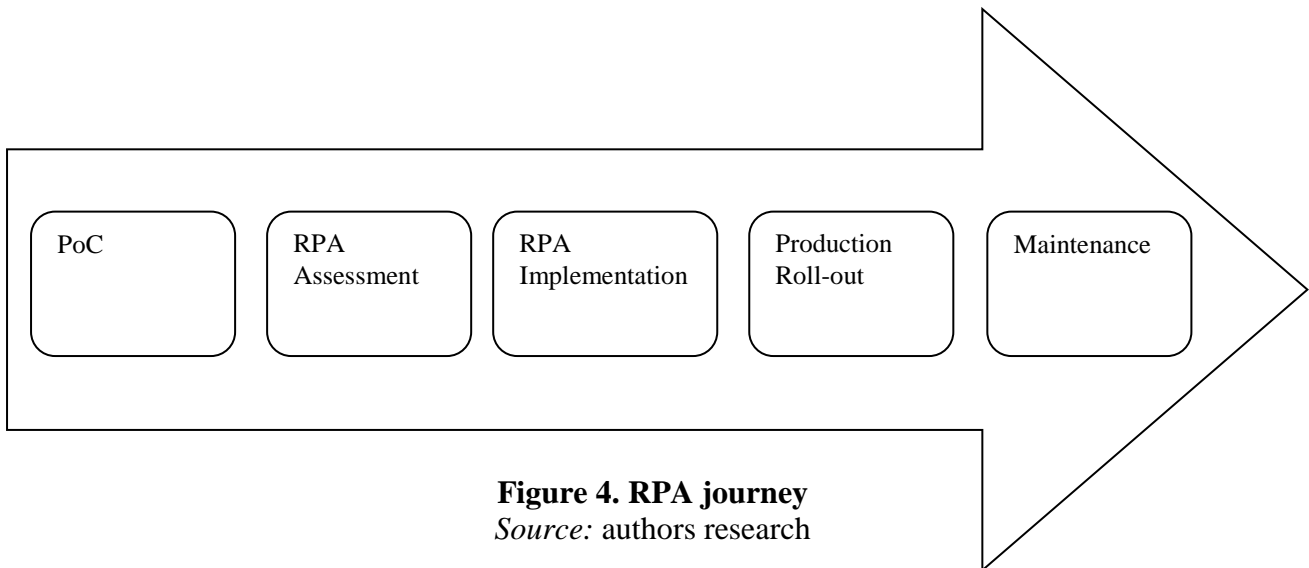
Figure 4. RPA journey
Source: authors research

In the PoC stage a process is chosen, a small automation team is built, a technology is chosen from the available ones in the market and a process is automated. The purpose of PoC is to validate both the technological approach and the benefits of running RPA. The risk in this stage is to start a PoC for the wrong reason. What an organization wants is to validate its business case assumptions.

When in RPA Assesment stage the organization tries to answer to the following questions:
- Which process has the highest potential for automation?
- Is it properly documented?
- Is it standardized across business units and regions?
- Is it optimal or does it need redesign?

The danger in this stage is to try to automate the wrong process that is too complicated, unstable, with multiple exceptions included, desired by management but not thoroughly followed by people.

Once a process or a list of processes that are truly fit for automation is established we move to the next stage which is RPA implementation.

In RPA implementation stage an automation team will build the RPA project, deploy that in non-production environment and test it thoroughly before moving on to the production roll-out.

When in production roll-out stage IT is going to become the operational owner of the RPA virtual workforce and manage it as any other business application in the company. This includes central management governed by business owners' defined rules and monitoring the number of software robots.

In the Maintenance stage based on requests coming from business owners IT is going to adjust the number of software robots, business owners are going to perform ROI analysis and request model improvements. Model improvements will be executed by the automation team and after proper testing will be promoted to the production environment by IT operations team.

4. WHERE CAN WE APPLY RPA?

RPA is suitable for back-office process automation in finance, procurement, supply chain management, accounting and HR. There are multiple time consuming processes that are ran in these departments where RPA can be applied. We can consider here processes like:

- Invoice processing as by combining OCR software with RPA one is able to extract all the fields and values from a scanned invoice. Then the software robot is going to start a session to the business application, input all previous read values and save it for further processing. Exceptions can be automatically redirected to a supervisor like VAT mismatch;
- registering customers and contacts in CRM software;
- registering orders in business applications;
- induction pre-requisites processing for new employees. When an exception occurs the process will notify the hiring manager for a decision or call to action.

RPA is also a solution for automation of IT operations like:
- creating users and roles in the domain by automating access and operations performed in Active Directory. Such a robot will authenticate in the administrative panel of Active Directory and add users and assign permissions to them;
- monitoring devices and services especially due to the fact that scaling is easy and the burden of hiring new personnel for high-load periods is removed.

RPA can also be used in call centers and shared services centers for automating processes like:
- creating tickets based on customers emails by extracting from the emails the email address, the name of the customer and use subject value as ticket subject and email body as ticket detailed request;
- providing automatic answers to specific questions regarding purchase orders.

5. RPA LANDSCAPE

According to both Forrester Research and Gartner the list of vendors competing is quite long and the leaders are Automation Anywhere, UiPath and Blue Prism followed by Peg systems and Work Fusion as strong performers as it can be seen in Figure 5.
According to (Le Clair C., 2017) Automation Anywhere has a focus on shared services like procure-to-pay, quote-to-cash, HR administration and other back-office processes.
Blue Prism was started as an idea distinct from BPM, thus making it special in terms of positioning in the market. Central management of a virtual workforce is the company's focus.
UiPath provides an open platform with the most advanced options in terms of automation. They have a different approach, they do not implement robots directly at customer site but rather use partners for running RPA implementation projects and they are building a strong community around their ecosystem.
WorkFusion "moved from cognitive assessment to execution according to the same study and is the option for analytics-based RPA while Peg systems "merges robots, analytics and case management".
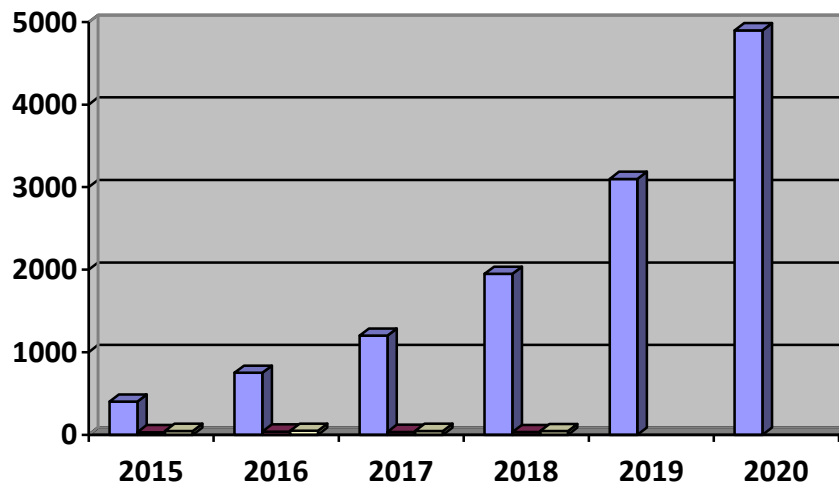According to (Statista, 2017) the RPA market size will reach 4.9 billion USD by 2020. According to the same source the top of departments in an organization that already have RPA implemented are IT for infrastructure and network operations support, Customer Service, Finance and accounting, Supply chain and logistics, Procurement and HR followed by industry specific processes. Some departments can benefit more than others from RPA implementation and the impact of software robots is dependent on the type of business operations.
RPA has a true potential to change the labor market so that the workforce of the future is a combined one with humans and software robots working together to achieve business objectives.
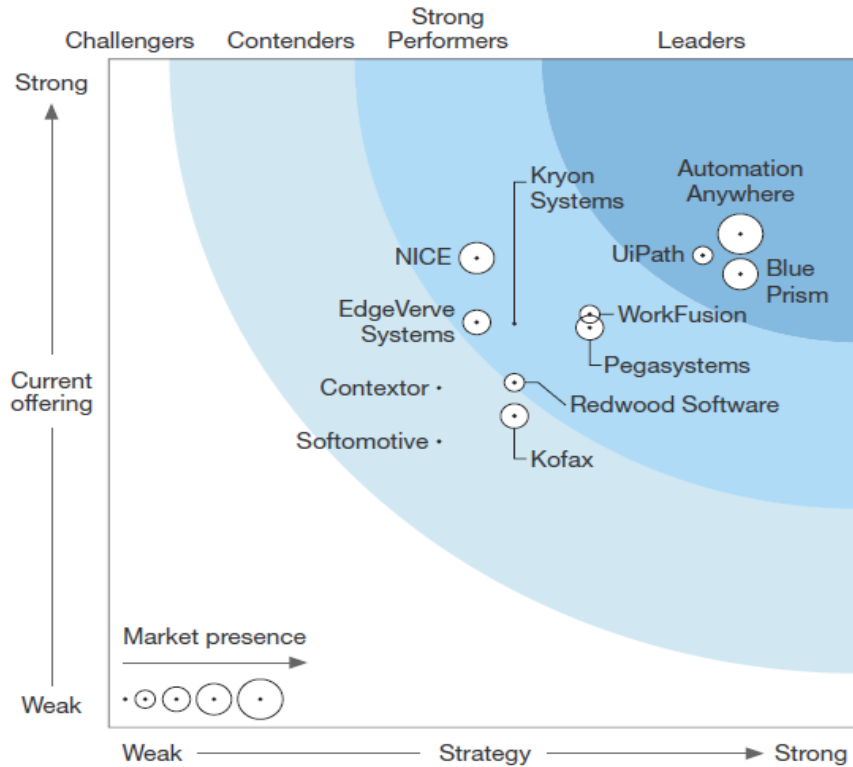
Figure 5. RPA vendors landscape
Source: Le Clair C. (2017)

It doesn't necessarily lead to job cuts but to professional conversion, new specializations in the field and a lot of opportunities for those who are not afraid of change. Still these are predictions and we will see in the future how they materialize.

Figure 6. RPA market size forecast in million USD
Source: adapted from Statista (2017)

According to (A.T. Kearney, 2016) a software robot costs one-third as much as an offshore employee and one-fifth as much as onshore staff leading to 25% to 50% in savings on selected back-office processes making this approach a key for further success of BPO centers around the world.

The BPO landscape in Europe is dominated by three countries. According to (A.T. Kearney, 2016) Poland is the leader with over 170000 employees working in the outsourcing industry in Warsaw, Kraków, Wroclaw, Katowice, and Lodz. It is followed by Romania with over 50000 employees working in over 50 centers spread across the country but mostly in cities with universities like Bucharest, Cluj Napoca, Timisoara, Iasi. The third in line comes Ukraine with a similar number of employees working in the outsourcing industry.

6. CONCLUSIONS

RPA is the next revolution after the first introduction of industrial robots. RPA itself cannot solve organizational issues and doesn't guarantee itself a performance increase. However proper analysis perfomed at the beginning of such a project can allow the management of the company to discover the proper processes to be handled by RPA. The processes to be automated need to be repetitive, standardized and management by exceptions should be an exception and not the rule. Processes are not going to be redesigned often after they are redesigned. Therefore the first stage should be analyzing which are the best candidates for automation, then performing business process reengineering to maximize the outcomes and only after that proceeding further with RPA.

Removing clerical work is one step while the other is repositioning and training employees for higher value tasks. RPA allows cost-cutting, increase efficiency and free employees to focus on creativity, reasoning to increase the value they add to organizations. Software robots don't get tired and scaling them is not difficult.

Once robots are implemented new human employees will not need to know the details of the processes being already automated which leads to a long term lack of knowledge if employees that implemented RPA leave the company. To mitigate this proper documentation and audit of the RPA implementation needs to be in place from day one.

The next stage of evolution for RPA is the introduction of Artificial Intelligence features for decision making processes. This will lead to more automated processes and eventually force another percentage of the medium qualified human workforce to professional reconversion. The positive aspect of this evolution is that it has the potential to define and introduce new highly skilled and in the same time high added value jobs in the labor market.

The major obstacle in moving to an RPA implementation are social acceptance and the impact on the labor market as society can stand against such an initiative due to the risk of cutting jobs with few options of professional reconversion. Technical knowledge is another important factor as without a center of employees to be specialized in RPA a full roll-out is hard to achieve.

Larger adoption of RPA will allow a higher pace of standardization in this field and will also increase the pressure for organization to move to new territories that are powered by Artificial Intelligence. A future paper will focus on this topic and how Artificial Intelligence can increase the knowledge level and performance of modern organizations.

REFERENCES

Kearney, A.T. (2016). *On the eve of disruption: 2016 A.T. Kearney Global Services Location Index.* Retrieved February 7, 2017, from https://www.atkearney.com/digital-transformation/article?/a/2016-global-services-location-index-Institute for Robotic Process Automation and Artificial Intelligence (2017). *What is Robotic Process Automation.* Retrieved May 15, 2017, from http://irpaai.com/what-is-robotic-process-automation/

Le Clair, C., Cullen, A., & King, M. (2017). *The Forrester Wave^{TM}: Robotic Process Automation, Q1 2017: The 12 Providers That Matter Most And How They Stack Up.* Retrieved March 11, 2017, from https://www.edgeverve.com/wp.../02/forrester-wave-robotic-process-automation.pdf

Lowes, P. (2016). *An introduction to Robotic Process Automation.* Retrieved June 10, 2017, from http://deloitte.wsj.com/cio/2016/03/13/an-introduction-to-robotic-process-automation/

McKinsey Global Institute (2017). Retrieved July 1, 2017, from https://www.autonews.com/Assets/pdf/MGI-A-future-that-works_Full-report.pdf

Statista (2017). *Size of the information technology (IT) robotic process automation (RPA) market for worldwide from 2012 to 2020 (in million U.S. dollars).* Retrieved April 1, 2017, from https://www.statista.com/statistics/647202/worldwide-robotic-process-automation-market-revenues/

Schatsky, D., Muraskin, C., & Iyengar, K. (2016*). Robotic process automation: A path to the cognitive enterprise.* Retrieved June 12, 2017, from https://dupress.deloitte.com/content/dam/dup-us-en/articles/3451_Signals_Robotic-process-automation/DUP_Signals_Robotic-process-automation.pdf

UiPath Forum. Retrieved May 22, 2017, from https://forum.uipath.com/t/how-to-take-a-screen-shot-of-selected-area-on-the-screen/1785.