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Risk Management in the Automation of Business Processes through the Application of Robotic Process Automation

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Abstract: *In a modern business environment with very big data flows, employee focus is crucial for success. This problem developed a need for new technological advancements such as Robotic Process Automation (RPA). As the RPA technology is relatively young, there is still an insufficient amount of research about which project management techniques are the best for it. This paper aims to recognize the key principles of risk management which can be applied to the automation of business processes through the use of RPA technology and to emphasize the significance of risk management for conducting successful RPA projects.*

1. INTRODUCTION

Today's business environment requires a fast response to changes and constant adaptation. Companies aiming to be competitive must constantly develop better business processes.

RPA enables process automation through "robots" performing processes the same as humans. Although it seems that creating RPA solutions is simple, while automating through RPA, companies may be faced with challenges that can be viewed as risks of the RPA projects.

There is little research on risk management in business process automation through RPA. Therefore, this research is based on literature that defines and explains the functioning of RPA technology and literature that deals with risks as components of project management.

2. THE TERM ROBOTIC PROCESS AUTOMATION

Although the term RPA alludes to actual robots going between offices performing tasks instead of people, it represents software-oriented solutions applied to other programs' user interfaces carrying out the business process the same as a human. In RPA, the word "robot" is equivalent to a software license (Kirchmer, 2017; Willcocks et al., 2015).

Robotic Process Automation can be applied to highly frequent, repetitive business processes with clear predefined rules of execution (HerbertNathan, 2017). By creating and using a digital workforce, RPA provides a more efficient business process execution (Kirchmer, 2017). Instead of complete automation, RPA aims to increase productivity, decrease errors in the work process and provide better services to clients (Panyi, 2020). This is achieved through the automated

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handling of standard situations while leaving exceptions to employees (Kirchmer et al., 2019). RPA should not take the place of people in total, but enable them to focus on complex work demands (Panyi, 2020).

Business process automation through RPA contributes to achieving various business benefits (Kämäräinen, 2018). There are various positive conclusions related to the implementation of RPA in literature case studies, but the positive outcomes must be the result of good management of the RPA projects, and especially adequate risk management.

One definition of risk is the uncertainty that may have a positive outcome. However, in the context of this paper, this aspect will not be considered and the word risk will be connected to the unforeseen, unfavorable outcomes of automating business processes through RPA.

3. BASIC CONCEPTS OF PROJECT RISK MANAGEMENT

Every project includes certain risks, regardless of the industry or department it relates to (Kendrick, 2015). The goal of risk management is to minimize the possibility of unfavorable events, and the strength of their impact if they occur (Tesch et al., 2007).

The Project Management Institute (PMI) has defined 6 steps that lead to successful risk management (Pritchard, 2014):

Step 1: Risk management planning
Step 2: Risk identification
Step 3: Qualitative analysis of risk
Step 4: Quantitative analysis of risk
Step 5: Creating plans of action
Step 6: Monitoring and controlling risk.

4. AN OPPORTUNITY FOR RPA AUTOMATION

For the research, risk management will be simulated on the RPA project example. As an example of an RPA project, a hypothetical business process will be considered.

For this research, it is assumed that the following opportunity for RPA automation was noted.

> *Every month many employees leave or join the company. It is necessary to cancel or obtain an insurance policy with a private medical insurance company for each person. From the internal system containing employee data, necessary information is gathered and per request sent to an external associate who provides private medical insurance policies. The application is sent by accessing the external system and finding and filling in the form, which differs depending on whether the insurance policy is opened or canceled. Several fields need to be filled in which takes 30 minutes on average. The process is based on rules from the moment the need to send a request is established.*

5. THE PLAN FOR RISK MANAGEMENT

Based on the authors' experience and RPA knowledge a risk checklist was formed (Table 1).[4]

[4] The checklist was based on the hypothetical list of the RPA projects that began in the imaginary company

Table 1. Checklist of risks for the RPA projects

Risk ID	Risk
1	The Subject Matter Expert (SME) incorrectly filled the robot making application
2	The SME demands a subsequent change in the execution of the business process
3	Problems with access to the systems used in the given business process
4	The existence of differences between the test and production environment
5	Employee resistance to the new way of working
6	Skepticism toward the new way of working
7	The business process based on the created documents is unclear to the developer
8	Lack of licenses
9	Conflicts among teams
10	Over automation
11	Incompatibility with the safety protocols
12	The developer has too much freedom
13	Unavailability of the test environments
14	Performance of the basic business function of certain business units endangered
15	Postponing important decisions
16	The SME is overburdened by his business activities
17	Phases of the project, on which subsequent phases depend, are late with execution
18	Updates and changes to systems that are used in the business process
19	The developer lacks experience
20	Suddenly abandoning the project
21	The SME found that a part of the business process is missing in the documentation
22	Lack of understanding of the RPA vocabulary

Most sources propose the risk probability be determined intuitively based on experience without calculating precise numbers, but rather that the probability of risks is classified as risks with high, intermediate, or low probability. Due to that, the risk probability will be calculated as a relative frequency of occurrence of risk in N number of conducted projects.

Definition 1. Let m represent the number of positive outcomes of event A in n repetitions of the experiment. Then the number

$$r = m / n \tag{1}$$

is the relative occurrence frequency of event A in n experiment repetitions (Kovačević, 2015).

Therefore, for every risk, the probability will be determined as:

$$\frac{\textit{The number of projects during whose realization the given risk occurred}}{\textit{The total number of projects which have been taken into account}^{5}} \tag{2}$$

As far as the impact is concerned, the authors will, for the research paper, determine it intuitively based on acquired experience in the field of RPA technology.

for the period of three months and imagined notes taken during the project's realization. Notes were analyzed and risks have been defined.

[5] Due to the fact that the checklist was formed based on a hypothetical list of RPA projects that began in an imaginary company in a 3-month period and imaginary notes taken during the project realization the number of projects in which a certain risk arose is known to the author.

6. IDENTIFICATION OF RISK ON THE SPECIFIC RPA PROJECT EXAMPLE

Based on the checklist above, the initial register of risks is formed (Table 2) when analyzing the selected business process for automation (opening/closing private health insurance).

Table 2. Initial risk register

Risk ID	Probability
1-1*	0,4
2-3	0,2
3-4	0,1
4-5	0,2
5-6	0,2
6-9	0,4
7-11	0,2
8-12	0,1
9-13	0,1
10-16	0,2
11-17	0,3
12-18	0,2
13-20	0,1
14-22	0,2

Note: * The second digit represents the risk ID from the checklist.

7. QUALITATIVE ANALYSIS

Probability can be great (≥ 0,5), intermediate (> 0,1 && < 0,5), or low (≤ 0,1), and the impact is viewed as high (one/more project aims endangered), intermediate (demands significant replanning) and low (bigger change of plans not required) (Kendrick, 2015). The estimate is made based on the Probability/Impact matrix. The qualitative analysis is provided in Table 3.

Table 3. Qualitative analysis of risks

Risk ID	Probability	Impact	Estimate
1-1	Intermediate	Low	Low exposure
2-3	Intermediate	High	High exposure
3-4	Low	Intermediate	Low exposure
4-5	Intermediate	High	High exposure
5-6	Intermediate	High	High exposure
6-9	Intermediate	High	High exposure
7-11	Intermediate	High	High exposure
8-12	Low	High	Average exposure
9-13	Low	Intermediate	Low exposure
10-16	Intermediate	High	High exposure
11-17	Intermediate	High	High exposure
12-18	Intermediate	High	High exposure
13-20	Low	High	Average exposure
14-22	Intermediate	Intermediate	Average exposure

For risks with high exposure, a quantitative analysis through the application of the Failure Models Effects Analysis (FMEA) technique follows.

8. QUANTITATIVE ANALYSIS

With the FMEA technique, a Risk Priority Number (RPN) is determined based on Occurrence, Severity and Detectability value (Carbone & Tippett, 2004). These values are measured on a scale from 1 (least adverse outcome) to 10 (most adverse outcome) (Perrin, 2007). The quantitative analysis is provided in Table 4. The higher the RPN, the greater the risk (more important on the priority list) (Perrin, 2007; Carbone & Tippett, 2004).

The authors view that in this case the best action is to classify the risks into low-priority and high-priority ones – RPN = 500 should be the referential value. Risks with an **RPN greater than or equal to 500** will be considered **high priority** for which action plans will be created.

Table 4. Quantitative analysis of risks

Risk ID	O	S	D	RPN = O*S*D
2-3	**10**	**10**	**6**	**600**
4-5	**10**	**7**	**8**	**560**
5-6	**10**	**7**	**8**	**560**
6-9	**10**	**9**	**6**	**540**
7-11	10	9	2	180
10-16	10	10	4	400
11-17	**10**	**10**	**10**	**1000**
12-18	**10**	**10**	**9**	**900**

9. PLANS OF ACTION

To act upon the noted high-priority risks, adequate responses to them should be created. Plans of action describe activities that will be carried out to decrease the high-priority risks.

There are numerous ways of responding to individual risk, however, all responses to negative risks fall into one of the following categories (as mentioned, in this paper only negative risks are taken into account) (Perrin, 2007):

Avoidance strategy: Eliminating the potential threat. For example, the project anticipates cooperation with an organization that has trade unions threatening to go on strike. The avoidance strategy would then be to choose a partner that does not have trade unions.

Transfer strategy: Some or all consequences are transferred to third parties connected to the given risk, including the responsibility for creating action plans. An example of this strategy is the purchase of an insurance policy or a purchase of another form of warranty.

Migration strategy: Decrease of probability or impact of risk. Designing systems of tolerance towards mistakes is an example of this strategy.

Acceptance strategy: Applied in cases when it is impossible to choose any other strategy.

Table 5. Plans of action for high-priority risks

Risk ID	Strategy	Plan of action
2-3	Migration	The risk has a very high impact on the RPA project's performance. So, activities should minimize the probability of this risk occurring. Before beginning to develop the RPA solution, a check of access to the demanded systems should be made. The RPA developer may attempt to access a certain system only after reaching the automation point where the system is used. So, the RPA developer and the SME should check if access to all needed systems is available beforehand.
4-5	Transfer	This risk occurs with all projects which imply changes in the established performance system of business activities. It is especially visible in RPA projects as the very word "robot" makes employees feel uncomfortable and afraid that they might be substituted. The proposed response to this risk is regularly reminding the higher management of how important it is to educate the employees and keep them up to date with the new information technology. Responsibility is transferred to higher management. They should be reminded of the importance of managing this risk whenever officially reporting. The assistance should be offered during employee education. Employees developing the RPA solution should prepare the education content and be exempted from other activities while conducting the education process. If possible, the employees being educated to be freed from their regular work activities, too.
5-6	Transfer	The risk can be overcome the same as the risk 4-5.
6-9	Migration	To avoid conflict during the RPA project's execution, communication and amicable rapport with all stakeholders should be maintained. Each time an official report is given, other stakeholders should be included together with the upper management.
11-17	Migration	To overcome this risk, precise deadlines must be set to carry out all RPA project phases before beginning to develop the solution and the resources necessary must be defined and provided.
12-18	Migration	Update and change applications and systems used in the business process greatly impact the RPA project's course. This risk has a great influence while maintaining the RPA solution. There should be official communication systems with the internal teams maintaining systems for business processes chosen for automation. They should promptly share information about any changes. If it is an external system, a similar deal should be made. This way of overcoming risk is deemed adequate, as often the same systems are used in different business processes chosen for RPA automation.

10. MONITORING AND CONTROL

Risk monitoring and control implies answering the following questions (Pritchard, 2014):

Question 1: Have the action plans been executed as proposed
Question 2: Have the action plans been as efficient as expected
Question 3: Has the project team followed the organizational policy and procedures
Question 4: Are the project assumptions still valid
Question 5: Have the triggers of risk occurred
Question 6: Have the new external influences changed the organization's risk exposure
Question 7: Have new risks occurred.

Further activity needs to be carried out in accordance with the answers, to monitor the risks.

11. FUTURE RESEARCH DIRECTIONS

As the research in question is independent, due to the confidentiality of the data for the needs of this research, real data could not be used, nor a real RPA implementation project. The research is based on information found in the available literature, and the authors' experience in

business process automation through RPA. An object of future study could be carrying out the noted steps for risk management on the sample of a real RPA project and defining the complete methodology for leading the RPA project which would consider all project aspects.

12. CONCLUSION

A case study has established that, for the given example of project automation of the business process through the application of RPA technology, the following risks are of top priority:

Risk 1: Problems with access to the systems which are used in the given business process
Risk 2: Employee resistance to the new way of working
Risk 3: Skepticism towards the new way of working
Risk 4: Conflicts among teams
Risk 5: Phases of the project, on which subsequent phases depend, are late with execution
Risk 6: Update and change systems that are used in the business process.

Also, for successful automation of the given business process, the following activities which present responses to the previously stated identified and prioritized risks should be conducted:

Risk 1: Compulsory check of the access to the requested systems before beginning development of the RPA solution
Risk 2: Every time an official report is made, the higher level of management needs to be reminded of the importance of the employees being educated about new information technologies and participating in the education in the field of RPA technology
Risk 3: When reporting, include other primary stakeholders with the higher management
Risk 4: Setting deadlines for the execution of all phases of the RPA project before starting to develop the solution and defining and providing resources necessary for carrying it out
Risk 5: Establishing official communication systems with the teams responsible for maintaining the systems used in business processes selected for the automation. They should, through those channels of communication, provide prompt information in case of any change.

It can be concluded that the RPA projects are mostly not complex, and not high risk, but exactly that may lead to a misconception that there is no need for risk management.

If risks are managed, it can be easily established whether the requested automation is risky. A feasibility study for individual RPA projects would be suggested. In the case of a high-risk RPA project, whose risks do not allow its execution, the project must be abandoned and the stakeholders informed. This way, major savings of key resources are made.

Financial analysis is not of key importance in deciding to carry out automation through RPA. Besides finances, the risks following automation must be considered. Only such an approach to automating business processes through RPA can achieve the benefits of RPA solutions.

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