THE BENEFITS OF ADOPTING AI AND RPA SOLUTIONS - USING ERP AS AN INTEGRATED INFORMATION SYSTEM - IN THE PRODUCTION AREA. A CASE STUDY.

BANTA VIOREL COSTIN,
THE BUCHAREST UNIVERSITY OF ECONOMIC STUDIES
viorel.banta@cig.ase.ro

Abstract
More and more companies in Romania have started to adopt the solutions offered by an integrated ERP system. This paper is a case study of a multinational company, located in Romania, being a subsidiary of a large investment group, located in Germany. The adoption of solutions that use Artificial intelligence (AI) and RPA - Robotic Process Automation, has added value to this company, reducing as much as possible, the errors in repetitive work. In this case study, we will see what impact the choice of such solutions had and how they helped the company in sensitive areas of the production plant. At the same time we will see how these solutions were extended to the area of accounting and human resources, what influences they had, how they were received. Moreover, the integration of such solutions has highlighted another aspect that the author will want to discuss in this scientific paper, namely how the existing staff in the company has adapted to these new software, with other interfaces and integration capabilities, by age groups, what were the staff movements and how new hires were made in that company. One thing is certain from now on, we will face more and more such adoptions of IT solutions, even the economic climate in the world facilitates such insertions of new technology in companies that will want to survive and strengthen their market position in the field in which it operates. The appearance of such IT solutions also implies a much more advanced level of knowledge, which the education system in our country will have to offer to those who will later engage in such factories, the insertion on the labor market in such fields of activity, being a low one, for the moment.

Keywords: *RPA, AI, ML, ERP, SAP, Rollout, Difficulties, Risks, Implementation.*

Classification JEL: M15, M41

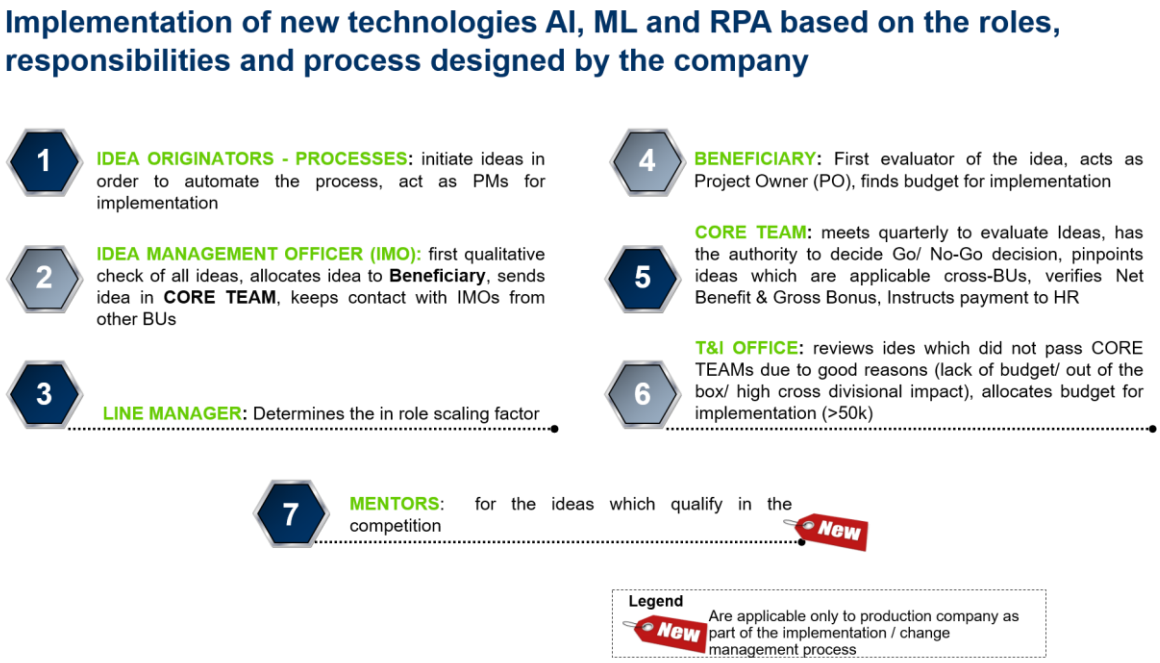
1. INTRODUCTION

The ERP solutions are currently irreplaceable in a company that wants to integrate most existing economic processes, to automate the flows it needs, to have permanent contact with customers and suppliers, which it needs so much, to carry out its activity. The business environment in Romania, little by little, wants to be competitive, in a globalization market, dominated by the big players in each field, or this cannot be done, without to add an good infrastructure, for any field, adapted to the new trends in software area, hardware, new technologies (Artificial Intelligence - AI, Machine Learning - ML or Robotic Process Automation - RPA). Everyone is aware of the importance of such investments, because that's what it's all about. The added value that came with these technologies is immediately apparent, which cannot be overstated in the fact that their importance, now, is a strategic one. Another aspect that must be taken into account is the qualified personnel to work with such technologies. Here, from most of the implementation projects in which the author of this article participated, we are not well at all. More and more universities in our country have started to modify certain curricula, those in the application area, just to cope with an increasing number of such requirements, coming from the business environment. It is good, however, that such technologies have begun to appear, that as we see lately in the world, the way of working is changing, so we will have to deal with such changes, given that we want to be competitive with other countries, where such insertions were made earlier.

2. THE ADOPTION OF NEW TECHNOLOGIES AI, ML AND RPA - IMPACT, RISKS AND DIFFICULTIES

The existence of an ERP system in a company, brings indisputable value, in several areas of activity, the fact that documents and data can be seen and analyzed immediately, the fact that the transmission of documents between departments is done automatically, when saving, brings value and a very short response time from the employees. Thus, in this context, if we bring the added value of the new technologies, applied next to the ERP type system, it is a great achievement. The production area is extremely impacted by the appearance of such solutions, the automation of a flow from demand, supply and production, being something that impacts extremely positively this area of activity, within a company. In the folowing figure (Fig.1) the author of this article provides an overview of the process of implementing a successful idea in the factory, where subassemblies for cars are produced:

Figure 1. Adoption of AI, ML and RPA – steps for implementation



The figure above describes all the steps that formed the basis of such an implementation. It is obvious that such an implementation was analyzed by all the teams that participated in the project. The idea came from the company's management, which wanted to automate as many processes as possible, so that repetitive things could be done automatically. In this way the errors appeared during the production process, to be eliminated.

In the table below, the author of this article summarized the criteria on the basis of which, for the case study, he analyzed the risks, difficulties but also the advantages of such implementations:

Table 1. Risks (R), difficulties (D), advantages (A) encountered in adoption of new technologies

Objectives and key results	Strategic		Operational		Financial		Compliance	
Teams	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**	**Internal**	**External**
IT	D, A	R	A	D	D	R	D	D

Production	R, A	A	D, A	A	D	A	R	A
Legal& Compliance	R, D, A	R, D, A	R, D, A	R, D, A	R, D, A	R, D, A	R, D, A	R, D, A
Finance	A	R	R, D	A	D	D	D	A
Management	A, D	R, D	A	A	R, D	R, D	A	A

3. THE FRAMING OF THE PRODUCTION ENVIRONMENT - CHARACTERISTICS

This article highlights the production area, with the disadvantages and advantages of this field. The implementation of solutions based on AI and RPA, brought major changes in this area of activity. The desire of the business environment to integrate such IT solutions, came to help perfectly the management of the company, especially now, in the context and the current situation, the one that humanity is facing in this period. The company mentioned in this article is based in Romania and is part of a large American group, which is headquartered in Deaborn, Michigan, Detroit. This production factory has as main field of activity the realization of car components, destined for the car dashboard areas. All production made here is done according with the process make-to-order. In this manufacture, the SAP process make-to-stock is not active. So, to produce a subassembly, you receive an order, from anywhere in the world. Response times should be as short as possible. This is the objective of adopting new IT solutions.

4. RESEARCH METHODOLOGY APPROACHED

The ways in which the author conducted this research was based on the fact that it was part of the implementation project, and he was able to make questionnaires, based on which certain conclusions were drawn, existing in this article. Moreover, the participation in the meetings in which the strategy of adopting the new solutions was developed, together with the company's management, was a starting point in the elaboration of the present study. A series of articles were read and followed, which had as a starting point, the implementation of ERP IT solutions in the manufacturing process. The quantitative and qualitative methods were adopted by the author, these having as purpose, the collection of information and data, which were subsequently analyzed and interpreted. This case study also brings into discussion organizational issues, being a good guide for those who will participate in the implementation of RPA solutions, in addition to integrated ERP systems.

5. RESULT OF THE PERFORMED STUDY

A number of 37 problems were identified, which were divided, in part, by risks, implementation difficulties and advantages found after the adoption of solutions was achieved, as are mention in the following table (some of them):

Table 2: The risks, difficulties and advantages encounted durrint the project

Risk No.	Risk Category	Risk Definition	Impact	Expectation	Control effort	RPA effect
1	Operational	Integration of existing data in the ERP system with the necessary RPA data	1	2	2	1
2	Finance	The budget discussed at the beginning did not correspond to the final budget - faulty analysis of the requirements related to the business	1	3	2	1

		environment				
3	Finance	There have been a number of price adjustments throughout the project, with implications of more than 30% of the initial project price.	1	1	1	1
4	Legal& Compliance	Initial higher cost for Romania RPA installation and no contract for maintenance was created	1	2	2	2
5	Management	Management involvement from the beginning was very low, which caused delays in decision making.	1	2	3	1
6	IT	The equipment we worked with was exceeded in terms of working time, it was necessary to purchase more hardware.	2	1	2	3

All the data collected by the author, above, from table 2, were collected in a file that was the basis of the evolution of the project, but which will be the basis for the best management of future projects. A series of irregularities were detected by the author, during this implementation, the inconsistencies between management and him, leading to small project delays. The figure below (Figure 2) describes the working matrix in terms of the analysis performed, as important, in the table above (Table 2).

Figure 2. The rules for Risk identification

This data collected during this implementation project can be a guide for future researchers and implementers of IT solutions of this type, to know what to prepare for and to avoid such events as much as possible.

6. CONCLUSIONS

The present case study highlights, how prepared and how the factory in Romania accepted the adoption of RPA type solutions. This decision was a beneficial one for the business environment in our country. How was the transition from manual to automatic optimization achieved, the production environment being the most targeted by these major changes. The introduction of "little robots" - using the new generation IT solutions has produced significant improvements in the production process, things that will be found in this case study. The improvements that such an implementation solution brings, highlight a series of small corrections that need to be made in the operational flow. This year brought major changes in terms of existing

management in Romanian companies, precisely in view of the Covid-19 crisis. A number of changes have taken place, from the emergence of autonomous automated lines, to the use of AI and RPA in key functions in the process running on an automatic line. Perhaps it is not for nothing that such a solution brings enormous improvements in the thinking of those who will use such an implementation, from project programming to the elaboration of the necessary steps for the development of future products. The company discussed in this article has connections around the globe, producing subassemblies and components for high speed cars, so the accuracy with which they work must be of a high level and very competitive. The implementation of IT solutions such as those discussed here, AI, ML and RPA has led to an increase in productivity by more than half of what is discussed before this implementation, so we can say that in addition to the difficulties we have faced, the implementation itself was a complete success, in a totally atypical year.

REFERENCES

Davenport TH and Kirby J. (2016). "Just how smart are smart machines?", MIT Sloan Management Review 57: 21.

Othmar Lehner, Susanne Leitner-Hanetseder, Christoph Eisl. (2019). „The Whatness of Digital Accounting: Status Quo and Ways to Move Forward", ACRN Oxford, JOURNAL OF FINANCE & RISK PERSPECTIVES, ISSN 2305-7394, Volume 8, 2019. Special Issue: Digital Accounting Hanken School of Economics.

Kokina J and Davenport TH. (2017). "The Emergence of Artificial Intelligence: How Automation is Changing Auditing". Journal of Emerging Technologies in Accounting 14: 115-122.

Kruskopf S., Lobbas C., Meinander H., Kira Söderling K., (2019), „Digital Accounting: Opportunities, Threats and the Human Factor ", ACRN Oxford, JOURNAL OF FINANCE & RISK PERSPECTIVES, ISSN 2305-7394, Volume 8, 2019. Special Issue: Digital Accounting Hanken School of Economics.

Bingi, P., Sharma, M.K., Godla, J.K., (1999) "Critical Issues Affecting an ERP Implementation", Information SystemsManagement, Vol. 16, Issue 3, pp.7-15

Bönnen, C., Drees, V., Fischer, A., Heinz, L. and Strothmann, K., (2016) "SAP Gateway and OData", SAP Press.

Shang, S., Seddon, P., (2003) "A Comprehensive Framework for Assessing and Managing the Benefits of Enterprise Systems: The Business Manager's Perspective," in Second-Wave Enterprise Resource Management Systems. Implementation and Effectiveness, edited by Shanks, G., Seddon, P.,Willcocks, L., Cambridge University Press

Somers, T.M., Nelson, K.G. (2004): "A taxonomy of players and activities across the ERP project life cycle," Information & Management, vol. 41: 257-278.

Sumner, M. (2000): "Risk factors in enterprise-wide ERP projects", Journal of Information Technology, Vol. 15, pp. 317-327

Gefen D. (2005), "A Multi-level Approach to Measuring the Benefits of an ERP System in Manufacturing Firms". Information Systems management, (2005). 22(1), p 18-25.

Gattiker, T.F., Goodhue, D.L., (2005) "What happens after ERP implementation: understanding the impact of interdependence and differentiation on plant-level outcomes,"MIS Quarterly, 29(3), pp. 559–585.

Chen, S.G.G., and Lin, Y.K/K (2008), "Performance analysis for Enterprise Resource Planning systems", Industrial Engineering and Engineering Management, IEEM2008, IEE International Conference, on pp. 63-67.

Stefanou, C. J., and Revanoglou, A., (2006), "ERP integration in a healthcare environment: a case study", Journal of Enterprise Information Management, 19(1), pp: 115-130.

Kamhawi, E. M. (2008), "Enterprise resource-planning systems adoption in Bahrain: motives, benefits, and barriers.", Journal of Enterprise Information Management, number 21(3), pp:310-334.

Gefen, D. and Ragowsky, A., "A multi-level approach to measuring the benefits of the ERP system in manufacturing firms," Information Systems Management, Winter 2005, 22, 1, 2005.

Boulianne, E., "The Weighting Effect of Balanced Scorecard Dimensions on Performance Evaluation," 30th Annual Congress European Accounting Association, 25-27 April 2007, pp.219, 2007.

Duh, R.R., Chow, C.W. and Hueiling, C., "Strategy, IT applications for planning and control, and firm performance: The impact of impediments to IT implementation," Information & Management, Vol. 43, pp.939-949, 2006.

Hoque, Z. and James, W., "Linking Balanced Scorecard Measures to Size and Market Factors: Impact on Organizational Performance," Journal of Management Accounting Research, Vol. 12, pp.1-17, 2000.