

THE INFLUENCE OF MODERN TECHNOLOGIES ON THE EFFECTIVENESS OF FINANCIAL PROCESSES, THE RESULTS OF QUESTIONNAIRE RESEARCH

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The influence of modern technologies

- *The aim of this paper is to explore accountants' views on usage of Robotic Process Automation technology (RPA) which brings efficiency increase. Robotization technologies which raise the efficiency of financial and accounting services make an important impact on the efficiency of modern business services sector. Application of RPA assumes replacing work of an existing employee with the use of dedicated software (software robots) to support activities, primarily repeated and uncomplicated, characterized by a low number of exceptions. RPA application is commonly used in modern business services, particularly in the areas of Finance, Accounting, IT and Human Resources Management.*

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- *By utilizing RPA technology, the effectiveness of operations increases while **reducing workload, minimizing possible errors in the process.** The non-parametric Spearman correlation coefficient and the non-parametric Kruskal-Wallis test and business case for the RPA implementation efficiency were used.*

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- Due to the fact that the survey was addressed to respondents of international companies located both in Europe (e.g. Germany, France, Poland, Slovakia) and on other continents (India, the United States, South American countries), the authors decided to conduct the survey using CAWI (Computer Assisted Web Interviews). The survey was conducted using SurveyMonkey, a professional survey tool which has extensive mechanisms for defining questions, the way they are answered, their analysis and visualization of results.

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- As a result of a personalized online survey addressed individually to over 500 respondents from international companies, 162 complete answers were received from the most important types of organizations in the modern business services industry, i.e. BPO/ITO, SSCs, Consulting/Advisory and their clients.

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- The main hypothesis (H₀): Proper implementation of RPA in the sector of modern business services increases the operational efficiency of organizations;
- Partial hypothesis (H₁): There is a relationship between the job position and the perception of the impact of RPA on individual benefits;
- Partial hypothesis (H₂): There is a relationship between the kind of company in the business services industry and the reception of the impact of RPA on individual benefits.

Table 1. Comparison of respondents with different roles in the organization in terms of assessing the impact of benefits associated with the implementation of RPA for specific benefits

| Rank the impact of the following benefits behind RPA on implementation on: | Position in the organization | | | | | | | | Kruskal-Wallis Test | |
|--|------------------------------|----|----------|-----|----------------|----|--------------------|----|---------------------|--------|
| | Executive Board | | Director | | Senior Manager | | Expert/ Specialist | | | |
| | M | Me | M | Me | M | Me | M | Me | H | p |
| Productivity improvements | 3.83 | 4 | 3.92 | 4 | 3.85 | 4 | 3.88 | 4 | 0.430 | 0.934 |
| Reduction of operating costs | 3.21 | 3 | 3.39 | 4 | 3.57 | 4 | 3.23 | 3 | 4.036 | 0.258 |
| Increased compliance with standards and procedures | 3.51 | 4 | 3.33 | 3.5 | 3.79 | 4 | 3.35 | 3 | 6.059 | 0.109 |
| Increase in customer satisfaction | 3.17 | 3 | 3.06 | 3 | 3.30 | 3 | 3.23 | 3 | 0.669 | 0.880 |
| Revenues growth | 2.47 | 3 | 2.31 | 2 | 2.91 | 3 | 3.04 | 3 | 10.568 | 0,014* |
| Decrease in the number of errors | 3.98 | 4 | 3.69 | 4 | 3.89 | 4 | 4.12 | 4 | 3.779 | 0.286 |
| Process acceleration | 4.02 | 4 | 4.00 | 4 | 4.08 | 4 | 4.31 | 4 | 1.800 | 0.615 |

Table 2. Comparison of respondents with different roles in the organization in terms of the expected level of benefits associated with the implementation of RPA on individual financial processes

| The expected level of benefits associated with the implementation of RPA on financial processes | Position in the organization | | | | | | | | Kruskal-Wallis Test | |
|---|------------------------------|----|------------|----|----------------|----|-------------------|----|---------------------|---------|
| | Executive Board | | Headmaster | | Senior Manager | | Expert/Specialist | | | |
| | M | Me | M | Me | M | Me | M | Me | H | P |
| Account payables | 3.28 | 3 | 3.86 | 4 | 3.87 | 4 | 3.88 | 4 | 9.025 | 0,029* |
| Account receivables | 3.26 | 3 | 3.54 | 4 | 3.42 | 4 | 3.69 | 4 | 3.792 | 0.285 |
| Travel and expenses | 3.13 | 3 | 3.53 | 4 | 3.35 | 3 | 3.62 | 4 | 3.376 | 0.337 |
| Intercompany | 3.11 | 3 | 3.38 | 3 | 3.45 | 3 | 3.35 | 3 | 2.404 | 0.493 |
| General ledger | 2.73 | 3 | 2.88 | 3 | 3.10 | 3 | 3.54 | 4 | 13.042 | 0.005** |
| Cash flow management | 2.49 | 3 | 2.65 | 3 | 2.78 | 3 | 3.15 | 3 | 6.468 | 0.091 |
| Management accounting | 2.67 | 3 | 2.71 | 3 | 2.86 | 3 | 3.12 | 3 | 2.979 | 0.395 |
| Taxes | 2.31 | 2 | 2.49 | 2 | 2.76 | 3 | 2.77 | 3 | 5.974 | 0.113 |

Table 3. Comparison of respondents from different types of organizations in terms of assessing the impact of benefits associated with the specific benefits from RPA implementation

| Rank the impact of the following benefits behind RPA on implementation on: | Organization type: | | | | | | | | | | Kruskal-Wallis Test | |
|--|--------------------|----|---------|----|------|----|---------------------|----|------------------|----|---------------------|-------|
| | Other | | BPO/ITO | | SSC | | Consulting Advisory | | BPO/SSC customer | | | |
| | M | Me | M | Me | M | Me | M | Me | M | Me | H | p |
| Productivity improvements | 3.93 | 4 | 3.74 | 4 | 3.77 | 4 | 3.98 | 4 | 4.11 | 4 | 1.905 | 0.753 |
| Reduction of operating costs | 3.31 | 3 | 3.16 | 3 | 3.50 | 4 | 3.37 | 3 | 3.56 | 3 | 2.446 | 0.654 |
| Improving compliance with standards and procedures | 3.48 | 4 | 3.26 | 3 | 3.56 | 4 | 3.68 | 4 | 3.89 | 4 | 4.686 | 0.321 |
| Increase in customer satisfaction | 3.14 | 3 | 3.13 | 3 | 3.27 | 3 | 3.10 | 3 | 3.67 | 4 | 3.128 | 0.537 |
| Revenues growth | 2.76 | 3 | 2.58 | 3 | 2.60 | 3 | 2.73 | 3 | 2.78 | 3 | 0.509 | 0.973 |
| Decrease in the number of errors | 3.69 | 4 | 3.81 | 4 | 3.98 | 4 | 3.98 | 4 | 4.22 | 4 | 4.586 | 0.332 |
| Process acceleration | 3.93 | 4 | 3.94 | 4 | 4.21 | 4 | 4.15 | 4 | 4.00 | 4 | 2.130 | 0.712 |

Table 4. Comparison of respondents from different types of organizations in terms of the expected level of benefits associated with the implementation of RPA on individual financial processes

| The expected level of benefits associated with the implementation of RPA on a financial process | Organization type: | | | | | | | | | | Kruskal-Wallis Test | |
|---|--------------------|----|---------|----|------|----|---------------------|----|------------------|----|---------------------|--------|
| | Other | | BPO/ITO | | SSC | | Consulting Advisory | | BPO/SSC customer | | H | p |
| | M | Me | M | Me | M | Me | M | Me | M | Me | | |
| Account payables | 3.68 | 4 | 3.71 | 4 | 3.66 | 4 | 3.68 | 4 | 4.00 | 4 | 1.047 | 0.903 |
| Account receivables | 3.46 | 4 | 3.19 | 3 | 3.52 | 4 | 3.56 | 4 | 3.33 | 3 | 3.335 | 0.503 |
| Travel and expenses | 3.25 | 3 | 3.45 | 3 | 3.16 | 3 | 3.65 | 4 | 3.33 | 3 | 7.328 | 0.120 |
| Intercompany | 3.61 | 4 | 3.00 | 3 | 3.53 | 3 | 3.05 | 3 | 3.56 | 4 | 10.011 | 0,040* |
| General ledger | 3.14 | 3 | 2.68 | 3 | 2.94 | 3 | 3.21 | 3 | 3.44 | 4 | 8.551 | 0.073 |
| Cash flow management | 2.89 | 3 | 2.42 | 2 | 2.73 | 3 | 2.87 | 3 | 2.67 | 3 | 4.538 | 0.338 |
| Management accounting | 3.29 | 3 | 2.65 | 3 | 2.78 | 3 | 2.72 | 3 | 2.56 | 3 | 7.715 | 0.103 |
| Taxes | 2.86 | 3 | 2.39 | 2 | 2.42 | 2 | 2.69 | 3 | 2.67 | 3 | 4.528 | 0.339 |

Table 5. Automation compartment indicated by the largest share of respondents

| Process | None or low (0-10%) | | Moderate eng. moderate (11-25%) | | Aver. eng. moderate (26-50%) | | High eng. high (51-75%) | | Very high eng. very high (above 75%) | | Total number of respon. |
|-----------------------|---------------------|----|---------------------------------|----|------------------------------|----|-------------------------|----|--------------------------------------|----|-------------------------|
| | % | N | % | N | % | N | % | N | % | N | |
| Account payables | 0.68 | 1 | 13.61 | 20 | 19.05 | 28 | 45.58 | 67 | 21.09 | 31 | 147 |
| Account receivables | 1.36 | 2 | 17.01 | 25 | 25.85 | 38 | 44.90 | 66 | 10.88 | 16 | 147 |
| Travel and expenses | 2.76 | 4 | 15.86 | 23 | 33.10 | 48 | 35.86 | 52 | 12.41 | 18 | 145 |
| Intercompany | 2.78 | 4 | 17.36 | 25 | 37.50 | 54 | 26.39 | 38 | 15.97 | 23 | 144 |
| General ledger | 4.90 | 7 | 23.08 | 33 | 39.86 | 57 | 25.17 | 36 | 6.99 | 10 | 143 |
| Cash flow management | 11.81 | 17 | 29.17 | 42 | 34.03 | 49 | 21.53 | 31 | 3.47 | 5 | 144 |
| Management accounting | 9.03 | 13 | 29.86 | 43 | 34.72 | 50 | 22.22 | 32 | 4.17 | 6 | 144 |
| Taxes | 14.48 | 21 | 35.86 | 52 | 29.66 | 43 | 16.5 | 24 | 3.45% | 5 | 145 |

Table 6. Personnel costs per job position definitions

| Position | Average monthly cost per employee | | |
|---|-----------------------------------|-------|-------|
| | Min | Avg. | Max |
| Personnel costs per employee handling processes from the Payables; Accountant 2-3 years of experience | 1.174 | 1.408 | 1.643 |
| Personnel costs of employee supporting processes in the GL group (incl., taxes, ledger); Accountant 2-3 years' experience | 1.408 | 1.585 | 1.761 |
| Personnel costs of 1st line IT support employee | 1.056 | 1.256 | 1.455 |
| Personnel costs of 1st line IT support employee | 1.056 | 1.256 | 1.455 |
| Personnel costs of 2nd line IT support employee | 1.174 | 1.549 | 1.925 |
| Personnel costs of 3rd line IT support employee | 1.878 | 2.582 | 3.286 |
| Personnel costs of developer | 2.113 | 3.052 | 3.991 |

Table 7. UiPath (Backend+Front) license cost

| License type | The cost of UiPath EUR/year |
|---|-----------------------------|
| Studio | 2.609 |
| Front | 1.043 |
| Backend | 4.348 |
| Assumption: 1 UiPath License supports 4 BOTs (robots) | |
| UiPath license cost per virtual machine (backend+front)/4 | 1.348 |

Table 8. IT maintenance costs (first, second- and third-line support)

| Position | Cost per employee in EUR | Quantity | Unit of Measurement Definition | Annual cost in EUR | Method of calculating the fee |
|---|--------------------------|----------|--------------------------------|--------------------|-------------------------------|
| The cost of UiPath (backend+front) license: robot per virtual machine | 2.696 | 25 | License | 67.391 | Yearly |
| IT maintenance costs (1st line of support) | 1.256 | 2 | 1 employee | 2.512 | Monthly |
| IT maintenance costs (2nd line of support) | 1.549 | 2 | 1 employee | 3.099 | Monthly |
| IT maintenance costs (3rd-line support) | 2.582 | 2 | 1 employee | 5.164 | Monthly |
| IT infrastructure costs | 750 | 100 | BOT | 75.000 | Monthly |
| Total | | | | 153.166 | Cost per 100 robots |
| No. of robots | | | | 100 | No. of pieces |
| Monthly cost per 1 robot | | | | 128 | EUR/m |

Table 9. Costs of design and software per robot together with the costs of process analysis, collection and transfer for use

| The components of the cost of robot designing and software | The level of complexity of the robot | | |
|--|--------------------------------------|--------|---------|
| | Simple | Medium | Complex |
| The time needed to create a robot: analysis, development, testing, documentation (workdays). | 20 | 30 | 40 |
| Average labor cost EUR/day | 106 | 153 | 200 |
| The cost of building 1 robot | 2.113 | 4.577 | 7.981 |

Table 10. Period of ROI in months and the value of savings after 12 months

| Financial process | Account Payables | | General Ledger | | Taxes | |
|--|------------------|--------|----------------|--------|----------|---------|
| Number of employees involved in the process (currently) | 4 | | 4 | | 4 | |
| The expected level of time reduction associated with the implementation of the robot (min/max) | 51% | 75% | 26% | 50% | 11% | 25% |
| The level of complexity of the robot | Medium | | Complex | | Complex | |
| Number of employees involved in the process (target) | 1.96 | 1 | 2.96 | 2 | 3.56 | 3 |
| The level of reduction in time consumption (number of people) | 2.04 | 3 | 1.04 | 2 | 0.44 | 1 |
| Monthly personnel costs per employee | 1.408 | 1.408 | 1.585 | 1.585 | 1.585 | 1.408 |
| Costs of the design and development of single robot | 7.981 | 4.577 | 7.981 | 7.981 | 7.981 | 7.981 |
| The number of robots to handle | 4 | 4 | 4 | 4 | 4 | 4 |
| Monthly IT support costs/robot | 511 | 511 | 511 | 511 | 511 | 511 |
| Monthly license cost/robot in EUR | 449 | 449 | 449 | 449 | 449 | 449 |
| The payback period per robot (months) | 3.00 | 2.00 | 12.00 | 4.00 | - | 18.00 |
| The value of savings after 12 months | 18.383 | 34.609 | 275 | 18.529 | - 11.133 | - 2.598 |

Accounting definitions

- Partial verification of hypothesis (H1), that there is a correlation between the job position and the perception of the impact of RPA on individual benefits in relation to revenues was confirmed.
- There is a correlation between the type of company in the modern business services sector and the perception of the impact of RPA implementation on individual benefits (H2).
- Further analysis showed very great possibilities of **practical use of robotization** in the implementation of financial services. It should be emphasized that there is **a very high rate of return** in the situation of the significant use of robots in financial processes.

Thank you for your
attention