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## Guest Editors' Introduction

# BOTSOURCING, ROBOSHORING OR VIRTUAL BACKOFFICE? PERSPECTIVES ON IMPLEMENTING ROBOTIC PROCESS AUTOMATION (RPA) AND ARTIFICIAL INTELLIGENCE (AI)

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Services, the largest component of the world's economy, have significant impact on shaping economic and social relations between organizations and human beings. For many decades, services sector has been cyclically evolving and changing, which has lately accelerated particularly due to the strong influence of emerging technologies. Certain solutions became a thing of the past, some started to transform faster, while others emerged disturbingly, revolutionizing current state of art. The ways and modes services enable humans and technologies to interact and cocreate value have also started to take new, innovative and fascinating forms. Over the past years, global services market got centralized and technologically reshaped influencing lives of us all. Offshoring (global sourcing), enabled by cloud computing, made multiple transnational companies take advantage of migrating some operational processes to different locations ('nearshore' or 'farshore'). Being under constant pressure of competitors' innovativeness, quality and price, organizations explore opportunities offered by the newest technologies and locations to standardize, speed up, simplify, and optimize end-user experiences and quality of service (Piotrowicz & Kedziora, 2018). Cultural and persuasive influence of high-tech made us all observe and experience radical technological changes in modern societies. Solutions based on processing data in a cloud, virtualization of servers, remote workspaces, and large databases of digital footprints, have gradually become completely natural, yet revolutionary and somewhat threatening. Automation with robotic software, advanced analytics, elements of artificial intelligence, recognition of analogue content and human voice, integration of cognitive views, chaining transactions onto blocks, Internet of Things (IoT) and edge computing have already made tremendous impact on the formulation of human-technology relations and experiences.


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Robotic process automation (RPA) technology has recently emerged and accelerated, already gaining status of a disruptive technology that revolutionized global services market. At its many reported implementations, RPA gets integrated with components of artificial intelligence (AI), allowing digital transformations at plethora of organizations, bringing them rapid results with low entry commitment and no radical changes required. This technology has drawn attention both among industry practitioners and academics, promising to sustainably and reliably improve operations and business processes, at the same time transforming human employees' role at the development of organization. RPA aims to release personnel from boredom of performing repetitive and mundane tasks, at the same time allowing them to collaborate with digital teammates, forming 'hybrid workforce' of the future (humans and robots executing activities together). The academic and professional debate has lately started to notice and explore such concepts as 'virtual backoffice', 'botsource', 'roboshore' and even 'aishore'. Firms that managed to successfully adopt and scale intelligent automation (IA) solutions, reported to achieve positive impacts on customer experience, financials, productivity, quality of delivery, strategic goals, and reduction of frustration (Kedziora et al., 2021). It is related to releasing personnel from performing non-value adding tasks that are so manual, time-consuming and monotonous that the more humans execute such, the more frustration they start to feel and more errors they start to make. The implemented use cases have been reported mostly at the business areas of finance, accounting, customer service, procurement and human resources (Agostinelli et al., 2019), but also non-commercial settings of healthcare (Airola & Rasi), in response to COVID-19 pandemic (Kedziora & Smolander, 2022). The emergence of IA, understood as enhancement of RPA and AI, allowed intelligent 'software robots' or 'intelligent bots' to minic actions of humas and process even unstructured data with use of process mining, optical character recognition (OCR), natural language processing (NLP), and machine learning (ML) (Kedziora & Kiviranta, 2018).

In this specific research context, it is essential to explore the successful implementations of RPA and AI from the perspective of novel solutions blending RPA, with elements of AI, particularly from the perspective of cultural, societal, and individual dimensions. The automation of manual work and its perception by human employees have been studied in the manufacturing and humanoid context (Ford, 2015), yet there is still room for extending its practical and theoretical implications on human–technology intersections. Human-technology interactions for the successful implementations of RPA and IA solutions, shall serve as scalable, robust, and well-perceived by the engaged human workers, are to appear as reference for application, evaluation, conceptualization, and advancement of this technology, putting human perception and perspective in its core.

## HUMAN-TECH INTERACTIONS FOR RPA AND AI IMPLEMENTATIONS

The RPA and AI technologies quickly scale up due to multiple benefits mentioned in the previous section, yet may be hindered with some risks causing unsuccessful case examples, referred to as Robotic Process Re-Manualization (Modliński et al., 2022). Consequently, as we witness a shifting paradigm from automating basic workflows to applications of more sophisticated products, solutions combining standard RPA with AI elements, there is room for deepening

available research on the topic. AI based data algorithms that are increasingly 'taught' to generate business rules for the robots, through describing, exploring, and utilizing digital footprints with probabilistic mathematic methods, require large data sets gathered over many years that may bring impressive results for processes done repetitively, massively, yet require high accuracy. As these phenomena can be studied from various perspectives and research dimensions, selected aspects of human-tech interactions for the successful implementations of RPA and AI are to be explored.

As the post-digital era, embracing ongoing advances in AI poses a question whether technology may be deployed to replace roles previously filled by human beings, including job supervisors/bosses. Replacing persons holding managerial positions seems very difficult, if not impossible. With no doubt, the role of technology at organizational development has been transforming, yet it is worth to experimentally consider the boundaries of an 'AI boss' adaptation at different types of organizations. Being able to understand which enterprises may adopt and which present strongest resistance to a bot-boss may help reducing such resistance. Hence, trying to navigate across a set of universal features of an 'AI boss' that make it acceptance, regardless of employees' and organization's culture, shall serve to define ways of controlling and managing hybrid systems in which some form of robo-boss exists. As the responsibility of AI is one of the key concepts studied at modern ethics, it is vital to study how to avoid biases in a hybrid working environment and whether personnel display a sufficient level of non-conformism to address such biases. The decision-making responsibility for the AI boss's choices, as well as its relation to its creators, employees, and senior managers is still unclear within business ethics and requires further academic investigation.

As it is evident that digital transformation in both business and social contexts require development of specific skills needed to successfully implement and manage emerging technologies. Concepts of Industry 4.0. and "Factory of the Future" (FoF) require building appropriate skills that will be required for the successful design, implementation, and management of AI solutions (Yao et al., 2017). The ongoing debate in industry and academia, emphasizes the need to identify gaps in digital skills, and the technology driven changes in societies and organizations, as it open various opportunities and new types of modes in the value-creation, incl. new roles and competences. Through comparisons of theoretical guidelines with expectations of end-users and employees, it is worth to explore and build a framework for designing training and educating future users, as well as interactors with technology

As already mentioned, automation technologies may go beyond software robotics, with such hardware applications as humanoid robot machines, able to facilitate core living conditions of aging western societies, such as safety, health, and housing. Future smart cities, will be forced to use robotic humanoid workforce for helping elderly at basic duties, improving their quality of life and residential conditions. It is therefore important to study how the design of humanoid robot applications should be conducted, in order to avoid biases and design products of best characteristics, tailored for various age, sex, education and residence place groups of elderly.

The impact of robotic technologies on organizational and economic aspects of enterprises constantly grows and is often being referred to as Robonomics (Ivanov, 2017). The continuous exploration and observation of RPA tools market is of major importance for the future research. The development and validation of research models, as well as practical recommendations on the successful adoption of RPA by companies may give valuable foresight on the future evolution of these technologies. As we can expect further combination and blending of RPA and AI,

intelligent robotization will allow companies to achieve results that go beyond financials, but enable quality improvements in services and products, exciting user experience, or advancement in the societal innovations. Hence, researching the assimilation of IA at companies and communities may bring further hyper-automation opportunities, if followed by proper framework.

## FUTURE OUTLOOK

The age of RPA and AI has certainly come and will have strong impact on the relations between humans and technology, as well as societies and businesses of tomorrow. The complexity and multidimensional characteristics of this concept created broad opportunities for further exploration and validation of available academic research. Resource and business effort of IA implementations, compensated by quick ROI, stability and numerous value types brought by its digital transformation are on the top of almost every company and community that has either been already robotizing some manual processes or is considering it for the near future. Hence, top provides of RPA solutions have been promoting the concept of 'citizen developer' that enables every office worker to learn basics of RPA programming and start configuring own software robots (Forrester, 2022). Particularly, during the challenging times of COVID-19 pandemic, intelligent automation market has rapidly grown and is most likely going to boost further, as many individuals, communities and organizations embark on the fast-track digital transformation journey with low-code solutions that is relatively easy to adopt. Securing quality and operational excellence in the first place, we will all need to boldly move forward with innovative solutions and initiatives to improve our communities and companies. Possibility of remote deployment and intelligent applications of software robots will allow for promoting Industry 4.0., at the same time minimizing the risk of service discontinuation or re-manualization, resulting from absences and down-breaks of operations. Investments at innovations and digital skills of employees, including RPA and AI shall certainly accelerate the strength and further growth of many societies, making their services more sustainable, disruption resilient and cost effective.

It is of utmost importance to focus on the sustainable transition onto the 'hybrid workforce' of the future, combining manual and digital delivery of work. Continuing exploration on how to successfully integrate software robots onto delivery team and increase acceptance for such technology by collaborative means shall grow as well. Only that will allow us to achieve effective collaboration of people and robots in an integrated way of processing business tasks, forming sustainable future of "humans in the loop". By automating specific work with use of wide technological umbrella, such information systems as RPA, will attempt to replace human actors altogether (Chakraborti, 2020). As it often leads to bias and resentment among human workers who fear losing their jobs, the execution and automation of previously manual tasks by intelligent systems are by no means a replacement of human employees, but rather an augmentation of their way of working (Gerber et al., 2020). Digital transition cannot be successful without proper synergy between all the stakeholders involved, such as automation analysts, maintenance engineers, developers, architects and managers from RPA Teams, as well as process experts and subject matter experts (SMEs) from business teams (Kedziora & Penttinen, 2020). It is therefore important

to constantly encourage business communities to innovate, submit automation ideas, communicate the change and recognize their efforts. Going beyond single Proof of Concept (PoC), or 'pilot project', while scaling up along the automation journey, requires mutual understanding and orientation around common goals that allows to follow the predefined implementation framework stages and address occurring challenges. It is important to remember that no matter how we name it: botsourcing, roboshoring or virtual backoffice, our horizon for the future digital evolution would make us trust technologies we build and keep our feeling of being a "man-behind-the-wheel", only if we control and use these solutions for our advantage, as indicated by the French activist of the early XX century, Emile Pouget: "*The worker will only respect the machine the day it becomes your friend, reducing your work, and not like today, who is your enemy, takes jobs and kills workers*".

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