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An Innovative Future through Robotic Process Automation, a Case Study

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Abstract. *Artificial intelligence and robotic process automation are among the next generation of digital technologies that are transforming the workplace and our daily lives. And digital transformation has become a critical strategy for many businesses and their leadership. In today's fast-paced and ever-changing business environment, the cornerstone of organizational success is innovation. As the business environment is in perpetual modification and development, it requires businesses to be adaptive to both external and internal factors. The instability of the organizational environment increases the necessity and benefits of employee innovation. The authors analyze the extensive literature defining artificial intelligence, focusing on automation and specifically the role robotic process automation has in increasing organizational efficiency, reducing cost, and ensuring quality. In expanding on the scientific literature surrounding robotic process automation, the article analyses a case study of a Romanian tech company whose complex internal technology ecosystem has resulted in a disconnected landscape which required constant multi-system manual intervention in order to ensure process and data cohesion. The authors present the company's response to the increased consumption of human capital on repetitive tasks that were increasingly subject to errors, in the form of robotic process automation and levels of machine learning and artificial intelligence. In following the progress of the company towards adopting robotic process automation to increase efficiency, speed, accuracy, and security of processes and tasks, the authors identify the benefits of directing human labor towards more meaningful activities and allowing the repetitive tasks to be shifted to robotic labor. The authors followed the progress of a service technology solutions organization that has established an IT intelligent operation ecosystem, with new strategies across various key departments such as finance, human resources, and Internal Audit, followed by their leadership perspective and thinking for the company's next steps in this case study.*

Keywords: robotic process automation, digital transformation, human resources, leadership, artificial intelligence.

Introduction

The next generation of digital technologies, such as artificial intelligence and robotic process automation, are playing a crucial role in the workplace and our daily lives. And digital transformation has become the core strategy for many enterprises and their leaders. Leadership plays a vital role in shaping and providing a context for people to unite and work towards their goals. Leaders should be responsible for fostering a culture of innovation by selecting candidates

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oriented towards newness and learning, apart from income generation. Xie et al. (2018) have identified trust as a promoter of innovation in an organizational environment. Trust in employees is the willingness of leaders to bear the responsibility of misjudging subordinates' credibility and leadership.

The transformational leadership style has been identified as a facilitator of creativity and innovation. This leadership style brings forward more automated processes as well as new technologies. The lack of fear in front of new situations, including artificial intelligence, is a positive point of transformational leaders being innovative. To promote innovation, organizations should promote a flexible culture and an internal atmosphere that can develop information movement and answer to new opportunities promptly. While innovation has been categorized as being closed (internal), collaborative (creating partner chains of stakeholders with shared values), open (from new sources), or co-innovation (based on partnerships between organizations), the differences between the four types reside in the shared values that an organization can have with their partners, stakeholders, and even other companies that can co-work in order to positively change the business field that they operate in.

Artificial intelligence solutions can perform intelligent tasks, accurately interpret external data, and recreate human-linked behaviors. Artificial intelligence has become more and more accepted in the business field as it replaces the human factor, replaces roles, and reshapes organizations. The ongoing transformation comprises every digital strategy, from mobile applications, process digitalization, artificial intelligence to disruptive technologies and novel digital thinking. In recent times, the speed of innovation has been incredible due to the frantic advances in technologies, sciences, digital transformation of organizations, and the strong effect of the increasing complexity of global value chains. Organizations are aware of the next steps they need to undertake in the artificial intelligence and robotic automatization fields.

Literature review

The business environment can be successfully compared to a living organism, found in a perpetual modification and development, under the influence of both external and internal factors. As Lukoschek et al. (2018) have underlined, in such an environment the cornerstone of organizational success is brought forward by innovation. And although it refers in an ambidextrous way to both explorative elements – developing new ideas, new technologies, new branches, and exploitative elements – using new techniques to ensure alignment and efficiency, a central element that receives more and more attention and trust is artificial intelligence. Through it, the younger generations will see this world transformed into a better place as change takes place all around us, whether we're aware or not. (Slimane, 2015)

Montani et al. (2017) have stated that employee innovation, considered to be the intentional creation, promotion, and implementation of new and useful ideas, is a main precursor of success and competitiveness in the business environment. Moreover, the instability of the organizational environment increases the necessity and benefits of employee innovation.

In fact, in order to be innovative, specific individual resources (for example: effort, focus) are required, that are directly impacted by the direction that the leadership gives in a company. And although organizations can invest in innovation even in crisis situations, a negative impact is beheld by specific work stressors, where work stressors are defined as being working conditions that demand adaptive behaviors from the part of employees. Such examples are role ambiguity and role conflict which have a detrimental impact on innovation.

Slimane (2015) notes that leaders are responsible to shape and provide a context for people to unite and work towards their goals. This focus on leadership in connection to the innovation strategy of an organization could imply that the fostering and leadership selection could be focused on candidates oriented to newness and learning, on idea generation apart than income generation, as the old models were suggesting.

Xie et al., (2018) have identified trust as being a promotor of innovation in an organizational environment, as well as the main role that the leader must help induce a trust centered organization. The transformational leadership style has been considered to be a facilitator of creativity and innovation, bringing forward more automated processes as well as new technologies. Another identified positive point within transformational leaders being innovative is the lack of fear in front of the new situations that new technologies, including artificial intelligence, bring forward. In fact, the trust of leaders in their employees can be defined as their willingness to bear the responsibility of misjudging subordinates' credibility and leadership, and their influence is the main important factor that influences innovation. Therefore, in order to promote innovation, organizations should promote a flexible culture and an internal atmosphere that can develop information movement and answer to new opportunities in a prompt manner.

Lukoschek et al. (2018) have also underlined that leadership exerts a decisive impact on behaviors related to innovation, having a direct influence on organizational efficiency. Recent researchers have started to promote leadership models explicitly tailored to the unique requirements of innovation, introducing creative leadership as a human capital focused model investing in internal knowledge development. In this context, the concept of dual innovation leadership describes two pattern behaviors focusing on both idea generation – generation of new and useful idea in any field, and idea realization – generation of a specific prototype or model that can be applied. Certainly, all sorts of innovative actions must also focus on efficiency, in order to be successful, although the span of time that the efficiency gain could be obtained, might be a very long one.

The three stages of innovation process, as described by Haefner et al (2021), are: (1) the recognition, identification, creation and generation of innovative ideas; (2) the exploitation of specific ideas, opportunities, and solutions; and (3) the evaluation and selection. These stages have been identified as triggers of organizational resilience, especially for small and medium enterprises post-crises events, but also for major organizations long term resilience and market stability. (Caballero-Morales, 2021). In fact, Ebersberger and Kuckertz (2021) have underlined that crises bring high potential of new needs to be answered in an innovative way, and a recovery precursor, therefore cutting down on budget for innovations should be avoided in any situation, innovation being synonymous with the added value of future organizations.

Lee and Trimi (2021) have underlined that innovation can be categorized as being closed (internal), collaborative (creating partners chains of stakeholders with shared values), open (from new sources) or co-innovation (based on partnerships of organizations). The differences between the four types reside in the shared values that an organization can have with their partners, stakeholders, and even other companies that can co-work to positively change the business field that they activate in.

Innovation has been considered as a human field, relying on their unique ability to innovate, but currently the idea that artificial intelligence and machine learning could replace the human factor, replace roles, and reshape organizations, has become more and more accepted (Haefner et al., 2021). The ongoing transformation comprises every digital strategy, from mobile applications, process digitalization, artificial intelligence to disruptive technologies and novel digital thinking

(Lin et al, 2020). In recent times, the speed of innovation has been incredible due to the frantic advances in technologies, sciences, digital transformation of organizations and the strong effect of the increasing complexity of the global value chains, therefore the organizations are well aware of the next steps they start to undertake in the artificial intelligence and robotic automatization fields.

Artificial Intelligence (AI) solutions could be defined as particular systems able to perform intelligent tasks, accurately interpret external data, and use these capabilities to perform specific tasks even by recreating human-linked behaviors, including social or emotional intelligence. (Johnson et al., 2022). The applicability of AI solutions is vast and goes from the business ecumene to medicinal, technological law and even artistic. The development has quickly influenced even tasks that were previously considered as strictly human, personal, and non-repetitive, such as interacting, learning, and solving problems. The development from narrow tasks to broader areas has been fast and it is now playing a major role in many companies, with a wide applicability.

Gurkaynak et al. (2016) have specified the three types of artificial intelligence, that are actually stages of AI development: (1) Artificial Narrow Intelligence refers to certain area specialized intelligence; (2) Artificial General Intelligence refers to human-type AI, as intelligent as people that could perform intellectual human tasks; and (3) Artificial Superintelligence refer to higher intelligence levels, those that overpass with much the human levels, including scientific creativity, wisdom and social skills. The same study underlined the fact that although the positive impact of Artificial Intelligence is known and recognized, there is still the fear factor that may hinder its dynamic and efficiency. This reaction is well acknowledged in the business environment, especially within corporations that develop change management strategies with strong communication campaigns in order to help people accept news more easily newness. Employees tend to consider artificial intelligence as a potential threat to their job and many try to oppose the change. This type of reactions risk wasting the real potential of Artificial intelligence efficiency.

Robotic process automation (RPA) is linked to AI in several ways. First, RPA can be seen as a subset of AI, as it involves the use of software robots that can perform tasks without human intervention. However, RPA is limited to performing pre-defined tasks and following pre-determined rules. According to the study of Johnson et al. (2022), Artificial Intelligence has been mainly adopted in order to increase human activities (55%) in research and development, rather than in the process of automation (11%). The automation capability is more underlined in sectors as information and communication technology, technology, and software and even government. The use in research and development shows a trend of exploration of these technologies, rather than exploitation, focusing on new products, new markets and their creating job opportunities, rather than job losses.

Second, RPA can be combined with AI technologies such as natural language processing (NLP) and machine learning (ML) to enhance its capabilities. For example, an RPA system that uses NLP can understand and respond to natural language requests from customers, while an RPA system that uses ML can learn from past interactions and improve its performance over time. Undey (2021) has noted that the most mature part of AI is image processing and computer vision using deep learning, that find major application within the business area and show the vast area of possibility in future years.

RPA and AI are often used together to automate complex business processes that require both structured and unstructured data processing. For example, an RPA system might be used to collect data from multiple sources, while an AI system might be used to analyze that data and make predictions or recommendations based on it. However, in order to adopt Artificial Intelligence, it is required to understand the organizational way in which added value can be obtained through

process automation, cognitive insight generation and cognitive engagement, defined as being the Artificial Intelligence capabilities of an organization. Through capabilities, it is understood the process through which a company will select, orchestrate, in order to then leverage on various Artificial Intelligence technologies with the purpose of creating added value (Mikalef et al., 2023).

Digital availability is currently being seen as an appreciated and highly used trend within organizations. Nowadays the main form of communication between customers and organizations has started to be the digital information exchange, mainly due to the immense amount of information and exchange that the social availability of organizations has created and has made it humanly impossible to cover in a timely manner. It is in this context that robotic process automation has gained acknowledgement as being a mandatory tool for future development. Defined as a set of techniques aiming to automatically execute any administrative, scientific, or industrial tasks, robotic process automation uses robots to obtain multiple executions of human tasks, with higher precision and in a shorter span of time. The tasks instructions of each robot are provided by the developers and include a high number of tasks such as logging into specific applications, copying, and pasting data, searching for online information opening emails, and filling certain forms (Ribeiro et al., 2021).

The techniques and algorithms that robotic process automation tools implement, include computer vision (through image recognition), statistical methods, neural networks for classification and prediction, decision trees, neural networks for classification and prediction, natural language processing, fuzzy logic and the implementation of techniques associated with text mining, and recommendation systems. (Ribeiro et al., 2021).

Ng et al (2021) have noted that robotic process automation has the capacity of yielding operational efficiency, promotes risk management and ensures adherence to compliance and quality. Some types of occupations that require manual work and basic cognitive skills are and will diminish while research and development jobs will flourish.

The Artificial Intelligence and specifically the robotic process automation is therefore not considered anymore tools of the future, but of today, making the difference between companies that will remain on the market and those that will disappear or be transformed completely by the new generations to come.

Methodology

The review of the literature revealed a constant need for process automation inside organizations. Also, in the current global agenda, the authors observed the interest in the process automation and digitalization, that nowadays is at one of its highest levels.

Bearing in mind the context, automation takes on a new dimension of application, with a direct and immediate impact on the company's prosperity and success. The authors will look at how digital transformation can bring a significant improvement to repetitive processes, by fastening and improving the team's capabilities.

The method used will be the case study. A case study is a method of research that will require an empirical investigation into a specific and current phenomenon. The research is done in a real-world context using several sources of information (interviews, questionnaires, testimonies, documents, and evidence). As already presented in the introduction, the authors have selected a tech company from Romania, that is active in automation subject. They are the perfect example of a successful automation leadership perspective, while allowing corporations to really develop their process automation agenda and productivity.

Results and discussions

Most Romanian companies have a low awareness of digitalization. For those with a strong level of awareness, the interest in this field is linked to two main aspects:

1. The need to save time and costs considerations
2. Keeping up with the fast business environment

Therefore, the next generation of Romanian companies will acquire rich experience in automation operation management in order to cover their maintenance functions. If we think about the end goal, it is providing operation and maintenance stability, more secure products, and ease of use. This is reflected in a case study of a primary operating department within a Romanian tech company responsible for important personnel management tasks such as recruitment, compensation, career development, and benefits administration, where the human resources and IT teams have pursued information transformation since the 1990s. Since then, the teams have gradually incorporated a variety of technologies to improve the internal HR management systems. The rising complexity of digital and intelligent transformation makes achieving digitalization through simple data integration and system improvements increasingly difficult.

Daily routines in human resources frequently require cross-system activities, repetitive manual input, manual verifications, and other "manual-intensive" tasks. Individual income tax declaration, attendance data verification, the recruiting procedure, and other typical duties are examples. These jobs are monotonous, time-consuming, and prone to mistakes. As a result, this Romanian IT firm has been seeking for solutions to accomplish the next stage of digital transformation in order to optimize the human resources department's processes.

The first stage in achieving success with robotic process automation is screening the relevant processes. They ranked procedures that might be improved. Mechanisms were then measured and selected for deployment based on their return on investment. The following is a schematic of the procedures that were prioritized:

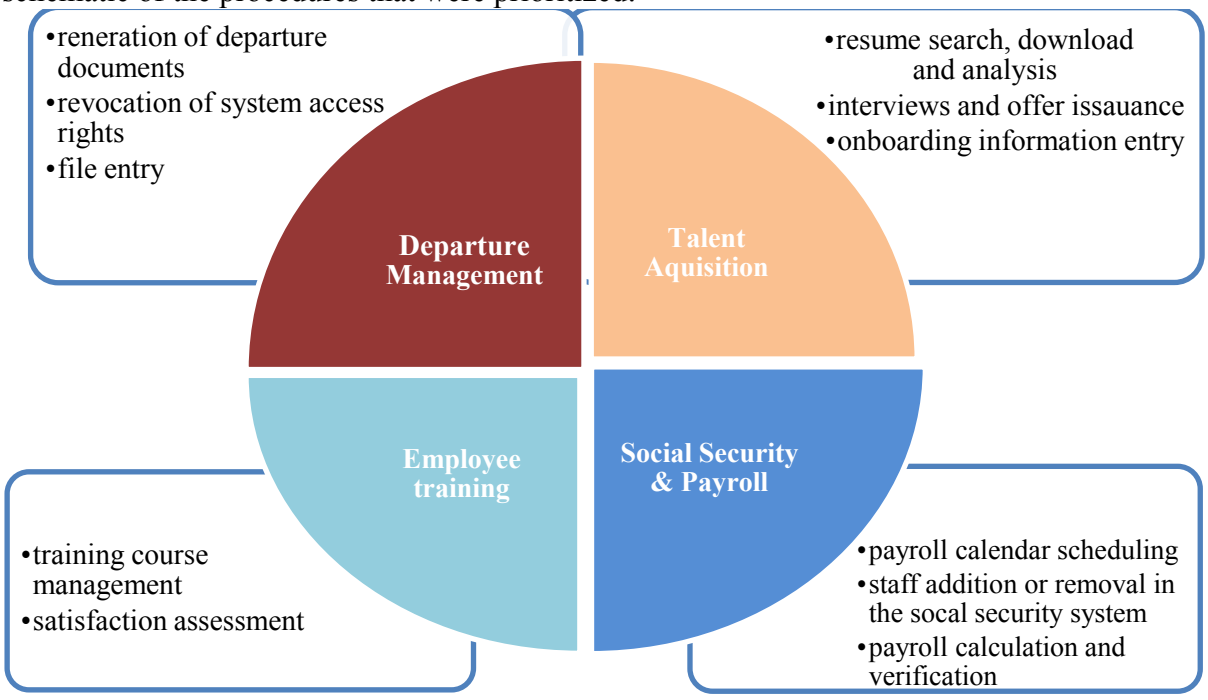


Figure 1. Automated processes in a Romanian company

Source: Developed by authors based on the study case.

The whole process is highly visualized, structured, and digitalized so that the management and leadership team can focus on the decisions for team alignment and productivity.

For example, for the payroll priority, the human resources team must compute and check employee attendance and payroll for hundreds of legal entities per month. This process requires a lot of repetitive human computations, verification, and many procedures across systems and platforms, which are time-consuming and labor-intensive. Human resources professionals may now execute streamlining in a modular manner using robotic process automation. The project's adaptability, scalability, ease of maintenance, and reusability are assured.

Each year, the payroll staff must carefully arrange and construct the payroll calendar while considering the Romanian holidays. This procedure generates a lot of discomfort for employees since it is time-consuming and has a high mistake rate due to the complicated data logistics.

Human resources workers would conduct the processing logic in the old development paradigm, introducing subjective judgements or duplicate procedures. In this case, the developer must rewrite the procedure after automating it. They designed a system to synthesize the knowledge base and created a calendar generating robot using robotic process automation. To rectify the logical knowledge base, the findings were cross-checked against real data until the match was greater than 90%.

Previously, this investigated Romanian IT firm had a minor component of its business that required manual processing, and human error was inescapable. Since the implementation of robotic process automation, the accuracy of these business activities has greatly increased, with no business faults occurring. Furthermore, process efficiency has increased five to eight times.

In terms of cost, robotic process automation saves the human resources team more than 6,000 hours each year. Employees now have more time to complete important jobs. "Robotic process automation liberates our employees from recurring, manual processes. Not just in terms of workload, but also as a mental break for our employees," explained the company's Payroll Director. They also intend to expand the use of robotic process automation in the future. "There will be more robotic process automation demands in the near future, and we expect human resources duties to be more automated and smarter," said the company's Vice President.

Because of the immediate commercial impact, stability is the most critical. For example, an upgrade to the individual taxation system may result in a new pop-up that the robot is unable to detect, thereby impacting operational and maintenance tasks. The technology firm recognized and upgraded the pop-up information library automatically to ensure the smooth functioning of robotic process automation, lowering the strain of operation and maintenance.

The company's success with RPA is due to its commitment to digitalization and information transformation since the 1990s. The company has gradually incorporated various technologies to improve its internal management systems. The rising complexity of digital and intelligent transformation, however, makes achieving digitalization through simple data integration and system improvements increasingly difficult. Therefore, RPA has been identified as a solution to accomplish the next stage of digital transformation and optimize the human resources department's processes.

Customers can begin the process using the self-service robot or our mobile app; as a provider, one has a choice of process access options, comprising self-service, operational and maintenance features on their service platform. This enables users to begin the automated process at any time and from any location.

In terms of data security, the investigated company follows a rigorous hierarchy: Restricted, Confidential, Internal, and Open Data. They manage data creation and utilization based on the data

level of classification. At the Open Data security level, business teams are accountable for keeping highly private raw data (such as personnel identity information and payroll information) apart from the data.

Because the robot directly works with highly confidential and significant data, robotic process automation projects take special care to protect the security of data storage hard disks, data backup, and recovery logic. Furthermore, permissions are carefully designed. For example, they provide a robot with identity and access to the application system. On the other side, it oversees tenant configuration and management, as well as robot configuration and management. Therefore, users can only see, start, or halt robotic process automation processes that they have authority to access, start, or pause.

The incorporation of powerful artificial intelligence technology is another feature of the automation method. In addition to clustering algorithms in payroll calendar development projects, the business integrates artificial intelligence, machine learning, and automated monitoring to automate individual sub-processes all the way up to whole departmental procedures. The Romanian IT firm has effectively and extensively used artificial intelligence technologies. By merging robotic process automation, artificial intelligence, machine learning, as well as other integration technologies, we may provide a positive example for other businesses on their path to being completely automated. The company's success with RPA has led to plans for future expansion of RPA use in the human resources department. The company expects that more human resources duties will become automated and smarter, freeing up employees to focus on more important tasks. Overall, the Romanian tech company's success with RPA demonstrates the potential for AI to significantly impact a company's success in terms of time savings, cost reductions, and increased efficiency and accuracy.

Conclusion

In conclusion, the low level of awareness of digitalization and robotic process automation among most Romanian companies indicates a significant opportunity for growth and innovation. However, for the few Romanian companies that have recognized the potential benefits of digitalization, the need to save time, reduce costs, and keep up with the fast business environment are the main drivers. These companies are investing in automation to optimize their processes and increase productivity.

The case study of the Romanian tech company's human resources department demonstrates the benefits of robotic process automation in improving daily routines that are frequently cross-system and repetitive. The use of robotic process automation to streamline procedures and automate calculations and verifications in the payroll and calendar generation processes has reduced the time and effort required while minimizing errors. The adaptability, scalability, ease of maintenance, and reusability of robotic process automation provide a flexible solution for process optimization that can be applied to various fields.

Moreover, the rising complexity of digital and intelligent transformation poses a significant challenge to achieving digitalization through simple data integration and system improvements. This indicates the need for a more strategic and structured approach that identifies the relevant processes and measures them based on their return on investment. This requires a highly visualized and digitalized process that enables management and leadership teams to focus on decision-making for team alignment and productivity.

As automatic has clear benefits and companies are looking to invest in unlocking them, limitations must be acknowledged as well. As there is an inherent tendency for workers to attempt

to simplify their activity and exploit shortcuts, attempts to automate tasks must be observed through the lens of how the tasks are actually performed and not only via the pre-documented material, granular as it may be, in order to obtain the best results (M. de Leoni et. Al, 2013).

Automation of processes will only be as effective as documenting the processes themselves; therefore, further focus is required on automating the process mapping itself, developing more and more accurate and efficient scripts and further delving into the field of Robotic Process Mining. Existing research elaborates on ways to automate robotic process automation script generation by effectively mining user activities, routines and patterns and generating outputs that serve as an accelerated automation path. (V. Leno et Al, 2021).

The success outlined in the case study reflects the benefits of adopting RPA technology; however, it is to be expected that continuous investment in automating processes will not yield linearly improved results. Further research is required to establish the extent of diminishing returns and a wider array of case studies is required to establish whether there is uniformity in the benefits obtained across businesses in multiple fields of activity.

Overall, the next generation of Romanian companies needs to acquire rich experience in automation operation management to cover their maintenance functions, provide operation and maintenance stability, and produce more secure and user-friendly products. The benefits of digitalization and robotic process automation are immense, and early adopters are already reaping the benefits of increased productivity and cost savings. Companies that fail to recognize and embrace this change risk being left behind in an increasingly competitive business environment.

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References

Caballero-Morales, S. O. (2021). Innovation as recovery strategy for SMEs in emerging economies during the COVID-19 pandemic. *Research in international business and finance*, *57*, 101396.

Ebersberger, B., & Kuckertz, A. (2021). Hop to it! The impact of organization type on innovation response time to the COVID-19 crisis. *Journal of Business Research*, *124*, 126-135.

Gurkaynak, G., Yilmaz, I., & Haksever, G. (2016). Stifling artificial intelligence: Human perils. *Computer Law & Security Review*, *32*(5), 749-758.

Haefner, N., Wincent, J., Parida, V., & Gassmann, O. (2021). Artificial intelligence and innovation management: A review, framework, and research agenda☆. *Technological Forecasting and Social Change*, *162*, 120392.

Johnson, P. C., Laurell, C., Ots, M., & Sandström, C. (2022). Digital innovation and the effects of artificial intelligence on firms' research and development–Automation or augmentation, exploration or exploitation?. *Technological Forecasting and Social Change*, *179*, 121636.

Lee, S. M., & Trimi, S. (2021). Convergence innovation in the digital age and in the COVID-19 pandemic crisis. *Journal of Business Research*, *123*, 14-22.

Leno, V., Polyvyanyy, A., Dumas, M., La Rosa, M., Maria Maggi, F., Robotic Process Mining: Vision and Challenges, Business & Information Systems Engineering, 63(3), pp.301-314

Leoni, M., Dumas, M., Gacia-Banuelos, L., 2013, Discovering branching conditions from business process execution logs, Proceedings of the 16th international conference on Fundamental Approaches to Software Engineering, pp. 1-15

Lin, W. L., Yip, N., Ho, J. A., & Sambasivan, M. (2020). The adoption of technological innovations in a B2B context and its impact on firm performance: An ethical leadership perspective. *Industrial Marketing Management*, *89*, 61-71.

Lukoschek, C. S., Gerlach, G., Stock, R. M., & Xin, K. (2018). Leading to sustainable organizational unit performance: Antecedents and outcomes of executives' dual innovation leadership. *Journal of Business Research*, *91*, 266-276.

Mikalef, P., Lemmer, K., Schaefer, C., Ylinen, M., Fjørtoft, S. O., Torvatn, H. Y., ... & Niehaves, B. (2023). Examining how AI capabilities can foster organizational performance in public organizations. *Government Information Quarterly*, 101797.

Montani, F., Courcy, F., & Vandenberghe, C. (2017). Innovating under stress: The role of commitment and leader-member exchange. *Journal of Business Research*, *77*, 1-13.

Ng, K. K., Chen, C. H., Lee, C. K., Jiao, J. R., & Yang, Z. X. (2021). A systematic literature review on intelligent automation: Aligning concepts from theory, practice, and future perspectives. *Advanced Engineering Informatics*, *47*, 101246.

Ribeiro, J., Lima, R., Eckhardt, T., & Paiva, S. (2021). Robotic process automation and artificial intelligence in industry 4.0–a literature review. *Procedia Computer Science*, *181*, 51-58.

Slimane, M. (2015). Relationship between innovation and leadership. *Procedia-Social and Behavioral Sciences*, *181*, 218-227.

Undey, C. (2021). AI in process automation. *SLAS TECHNOLOGY: Translating Life Sciences Innovation*, *26*(1), 1-2.

Xie, Y., Xue, W., Li, L., Wang, A., Chen, Y., Zheng, Q., ... & Li, X. (2018). Leadership style and innovation atmosphere in enterprises: An empirical study. *Technological Forecasting and Social Change*, *135*, 257-265.