9. BUSINESS PROCESS AUTOMATION: TECHNOLOGIES AND TOOLS

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Annotation. This scientific paper represents a study of business process automation, emphasising its ability to optimise operations, reduce errors, and enhance efficiency across industries. his scientific paper examines how the integration of technologies such as artificial intelligence, machine learning, robotic process automation, and cloud platforms forms the cornerstone of business process automation, enabling both task automation and enhanced decision-making capabilities. This scientific paper highlights the growing prevalence of AI adoption among large enterprises, underscoring its transformative role in modern operational frameworks. This research delves into the unique functional capabilities of various types of business process automation, demonstrating how these technologies enable companies to achieve higher productivity, optimise resource management, and improve customer experiences.

Keywords. Business process, business process automation, robotic process automation, artificial intelligence, cloud platforms, business process automation software.

A business process is a series of activities created to achieve a specific organisational goal, such as product production, financial processing, employee onboarding or new customer acquisition [1]. These processes often span multiple departments and involve a sequence of tasks that can be fully or partially automated.

Business process automation differs from other automation types due to its complexity and integration with multiple enterprise IT systems [2]. It is customised to an organisation's specific needs and may use a variety of technologies, including robotic process automation, workflow orchestration, business process management, artificial intelligence and cloud platforms.

The primary goal of business process automation is to enhance operational efficiency, reduce human error, standardise processes and allow employees to focus on strategic tasks. By automating manual processes, organisations can achieve greater productivity and cost reductions, ultimately enhancing overall business performance.

Business process automation provides a number of opportunities for businesses [3]:

1. Reliability: process automation provides clear expression of who, what, when, and how participants must perform their assigned activities in order to achieve a process objective.

2. Capability composition: processes define how enterprise capabilities contribute and how they are networked to meet enterprise objectives.

3. Sharing: processes can engage shared capability services as subprocesses to deliver results. Sharing yields economies of scale from utilisation of resources and implementation of improvements.

4. Control: processes can ensure control for efficiency, to meet requirements for compliance with policies and regulations, and to mitigate risks.

5. Resource management: processes that consume the same resources and manage the same business capabilities can be consolidated for economies of scale and workload management.

5. Visibility: information technology can greatly improve process visibility. Business process models expose the design of business processes. Runtime monitoring tools enable workloads and performance to be observed in real time. Operating statistics and audit trails support analysis of processes for process improvement and accountability.

6. Optimisation: repeatable aspects of all business processes can be measured, and the impact of particular activities can be identified to determine where improvements are needed and to assess progress in implementation of changes.

7. Exploitation of advanced technology: in recent years, mobile computing, such as smart phones and wireless tablets, has enabled participants to be engaged in a process as it happens from nearly anywhere, at any time, and relevant information can be accessed over the Internet.

8. Modeling: modeling supports consideration of process design improvement based on operational measurements along with many other factors such as best practices, risks, accountability, authorisation, share ability, and enterprise-level optimisation.

9. Customer service: business processes can be driven by customer inquiries, orders, or order status requests over the Internet for rapid response to a global marketplace.

10. Agility: business process modeling enables definition and adaptation of processes to be quickly developed, and process automation supports rapid deployment with minimal need for training of participants and oversight of the transition.

To effectively harness the potential of business process automation, it is essential to understand the various types and their unique functionalities. Below there is an overview of the primary types of business process automation technologies, each of them is designed to address specific organisational needs and challenges.

Robotic process automation regarding Digital Transformation, refers to the conversion of human jobs in terms of repetitive and patterned tasks to an automatic computer process. In this sense, "robotic" is not a physical robot, but it is a "computer process" in the sense that it does the same work like a human's cognitive work[4]. The purpose of robotic process automation is to make employees to be concentrated on higher priority work and creative tasks besides low-value-added tasks. With the advantage of robotic process automation, many companies are applying robotic process automation throughout the value chain to improve productivity.

Robotic process automation has been implemented on various tasks to maximise productivity in the fields of production, sales, purchasing, finance, and employee management [5]. Many companies are promoting automation in production, sales and purchasing, finance, HR, and IT by using robotic process automation across the value chain to improve productivity. For example, data input, e-mail reception/sending, report writing, etc., as well as sales reports linked to the computer system, and market trend collection can be performed.

In the financial sector robotic process automation is widely used; it is applied to banks' non-face-to-face customer response services, and insurance companies' customer relation management and contract management. For repetitive inquiries, chatbots and RoboAdvisors are used for customer services such as retirement pension design, investment portfolios, funds, money laundering monitoring, cybersecurity, etc.

The other one of the representative examples of robotic process automation in the medical field is automated medical appointments according to various variables including doctor availability based on location and treatment attainability as well as financial statements and insurance information [6]. In addition, the RPA robot was applied to the task of providing patient data to the medical analysis service for more accurate and improved patient treatment.

Business Process Automation Software represents technological solutions that help organisations automate and optimise their business processes [7]. This involves using various tools and systems to automate repetitive tasks, improve efficiency, and reduce manual intervention.

Business Process Automation Software is widely used across industries to enhance efficiency and competitiveness. For instance, SAP and RemOnline systems allow to optimise accounting, improve management efficiency, and enhance customer service quality.

Business process automation also involves integrating modern technologies like artificial intelligence and cloud solutions, opening new opportunities for businesses. The benefits of automation include reducing process execution time, minimising errors, and increasing customer satisfaction. However, automation can also have drawbacks, such as high implementation and maintenance costs.

The key technologies in business process automation include Artificial Intelligence, Machine Learning, Cloud Technologies, Low-Code/No-Code Platforms, and CRM Systems.

AI refers to computer systems or machines that can perform tasks that typically require human intelligence [8]. These systems are designed to learn from experience, recognise patterns, analyse data, and make decisions with minimal human intervention. AI technology includes machine learning, deep learning, and natural language processing techniques. This exceptional technology has the incredible ability to effortlessly handle massive amounts of data at lightning speed. As a result, enterprises can unlock invaluable insights, streamline operations, and completely transform their approach. From customer experiences to business strategy, AI transforms the business world by enhancing efficiency, improving decision-making and driving innovation.

With AI-powered tools and systems, organisations can streamline business processes, personalise customer interactions, and optimise resource management. Implementing AI presents several challenges that require responsible and genuine actions to effectively address privacy risks and ethical concerns. As AI continues to evolve, it promises to reshape the business landscape and create new opportunities for growth and success.

Machine learning learns from experience and is used for highly granular marketing analyses on big data. Within machine learning, reinforcement learning learns from a set of training data, while supervised learning detects patterns in data that aren't labeled and for which the result isn't known [9]. Deep learning is a class of machine learning that learns without human supervision, drawing from data that is both labeled and unlabeled; it is used in image and voice recognition and self-driving cars. Neural networks are algorithms that endeavor to recognise underlying relationships in a set of data through a process that mimics the way the human brain

operates, and they are applied in credit and loan application evaluation and weather prediction. Natural language processing (NLP) is a computer program able to understand human language as it is written or spoken and is used for speech recognition, text analysis, translation, and generation. Rule-based expert systems use a set of logical rules derived from human experts and find application in insurance underwriting and credit approval. Robotic process automation (RPA) consists of systems that automate structured digital tasks and interfaces, such as credit card replacement and validating online credentials. Finally, robots are automatically operated machines that automate physical activity, manipulate, and pick up objects, typically used in factories and warehouses.

Cloud technologies play a crucial role in modern business process automation [10]. They enable organisations to utilize computational resources (servers, storage, software, etc.) over the Internet, rather than installing and maintaining them locally. This opens up vast opportunities for optimising, scaling, and improving business processes.

In the context of automating business processes, cloud technologies imply cloud platforms, cloud services, integration platforms as a service.

Cloud Platforms provide the infrastructure on which automated processes can be developed, deployed, and launched. Examples include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP).

Cloud Services are ready-made solutions for automating specific tasks. Examples include CRM (Customer Relationship Management) systems, ERP (Enterprise Resource Planning) systems, project management platforms, and marketing automation tools.

Integration Platforms as a Service (iPaaS) allow connecting various cloud and local applications, ensuring a seamless flow of data and automation of end-to-end processes.

Low-code technologies have become a significant trend in business process automation (BPA), offering organisations a way to optimise and accelerate the development of automated processes without extensive programming knowledge [11].

Low-code platforms provide visual interfaces and drag-and-drop tools that allow users to create applications and automate processes without writing extensive code. This approach simplifies the development process, making it accessible to non-professional users, such as business analysts and department managers.

Low-code platforms significantly reduce the time required for developing and deploying automated solutions, which allows businesses to quickly adapt to changing market conditions and customer needs. Low-code technologies foster better collaboration between IT teams and business departments, ensuring that automated processes align with business needs.

Customer Relationship Management (CRM) systems are essential for automating and optimising business processes, particularly in marketing, sales, and customer service. By integrating automation technologies, these platforms streamline repetitive tasks, enhance efficiency, and allow organisations to focus on strategic goals. Operational CRM automates workflows tied to customer interactions, such as lead generation and sales management, consolidating processes into a unified platform. Analytical CRM uses data analysis to uncover customer behaviour patterns, enabling personalised interactions and informed decision-making. Collaborative CRM facilitates real-time data sharing across departments, ensuring consistent and seamless customer experiences [12].

Business process automation represents a comprehensive approach to enhancing organisational efficiency, encompassing a wide range of tasks from automating routine operations to optimising end-to-end processes. It involves integration with various corporate information systems and can be implemented through diverse technological solutions, including robotic process automation, specialised software, artificial intelligence tools, and cloud platforms. The implementation of business process automation contributes to increased reliability and transparency of operations, improved resource management, optimised activities, and the creation of conditions for more effective use of advanced technologies and improved customer service quality. Key technological components of business process automation include artificial intelligence and machine learning systems, cloud technologies, and low-code platforms, each of which possesses unique functionalities to address specific organisational challenges and achieve strategic goals.

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