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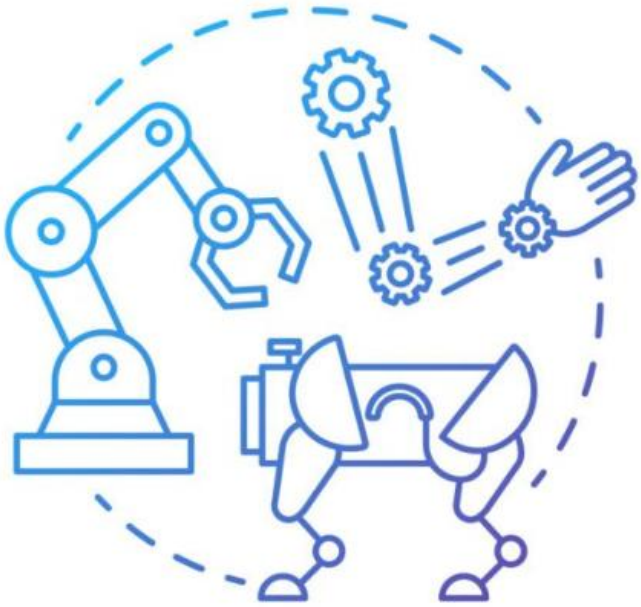

МАТЕРІАЛИ

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У збірник включені тези доповідей, які присвячені сучасним автоматизованим технологіям Industry 4.0 та їх впровадження; інформаційні управляючі системи технологічного призначення; математичні методи в системах автоматизації; розробка та програмування в робототехніці; штучний інтелект та машинне навчання в автоматизації; інтеграція технологій у виробництві та промисловості; сенсорні технології та взаємодія людини з роботами в Industry 5.0; ефективність використання роботизованих систем у виробництві; етика та правові аспекти в робототехніці; Інтернет речей та Інтегровані системи в комп’ютерно-інтегрованих технологіях, автоматизації та робототехніки; технологічні виклики та інновації у світі робототехніки.

Редакційна колегія: І.Ш. Невлюдов, В.В. Євсєєв.

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The collection includes abstracts devoted to modern automated technologies of Industry 4.0 and their implementation; information control systems for technological purposes; mathematical methods in automation systems; development and programming in robotics; artificial intelligence and machine learning in automation; integration of technologies in production and industry; sensor technologies and human interaction with robots in Industry 5.0; efficiency of using robotic systems in production; ethics and legal aspects in robotics; Internet of Things.

Editorial board: Igor.Sh. Nevludov, Vladyslav.V. Yevsieiev

ЗМІСТ

ROBOTIC PROCESS AUTOMATION AND INTEGRATION SYSTEMS FOR SMBS: PRIORITY PROCESSES AND SOFTWARE COMPARISON

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Annotation: The work examines the critical importance of implementing business process automation for small and medium-sized businesses in today's highly competitive economy. The main focus is on the analysis of practical automation tools, such as robotic process automation and cloud integration platforms (iPaaS), their comparative characteristics (Zapier, Make, UiPath), and application scenarios in finance, sales, HR, and logistics. The work emphasizes the necessity of preliminary process re-engineering, debunks the myth surrounding implementation costs, and provides a step-by-step strategy for successful digital transformation. The material is intended for owners and managers of SMBs who seek to reduce operational costs, increase data processing efficiency, and prepare their business for international scaling.

Key words: robotic process automation, Zapier, Make, UiPath, iPaaS, small and medium businesses.

РОБОТИЗОВАНА АВТОМАТИЗАЦІЯ ПРОЦЕСІВ ТА ІНТЕГРАЦІЙНІ СИСТЕМИ ДЛЯ МАЛИХ ТА СЕРЕДНІХ ПІДПРИЄМСТВ: ПРІОРИТЕТНІ ПРОЦЕСИ ТА ПОРІВНЯННЯ ПРОГРАМНОГО ЗАБЕЗПЕЧЕННЯ

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Анотація: У роботі розглядається критична важливість впровадження автоматизації бізнес-процесів для малого та середнього бізнесу в умовах сучасної висококонкурентної економіки. Основна увага зосереджена на аналізі практичних інструментів автоматизації, таких як RPA та хмарні інтеграційні платформи (iPaaS), їх порівняльній характеристиці (Zapier, Make, UiPath) та сценаріях застосування у фінансах, продажах, HR та логістиці. Робота підкреслює необхідність попереднього реінжинірингу процесів, розвінчує міф про вартість впровадження та надає покрокову стратегію успішної цифрової трансформації. Матеріал призначений для власників та керівників малого та середнього бізнесу, які прагнуть зменшити операційні витрати, підвищити ефективність роботи з даними та підготувати бізнес до міжнародного масштабування.

Ключові слова: автоматизація робочих процесів, Zapier, Make, UiPath, iPaaS, малий та середній бізнес.

In today's highly competitive environment, process automation is no longer an optional technological upgrade but a critical imperative for small and medium businesses (SMBs) to survive and scale [1-10]. By delegating routine tasks to software robots through robotic process automation (RPA) or utilizing cloud scripts via Integration Platform as a Service (iPaaS), companies can reduce administrative and financial operation costs by up to ninety percent [11-15]. Over sixty percent of Ukrainian SMBs are actively planning or implementing automation tools to maintain operations with fewer staff and build a foundation for international scaling. The true transformational value of modern automation lies in combining execution tools with mathematical forecasting within Customer

Relationship Management systems. For instance, regression analysis can predict customer churn and instantly trigger automated retention campaigns. Clustering algorithms, such as k-means, segment customer behavior, allowing automated platforms to dynamically route leads based on specific characteristics. Additionally, Bayesian methods continuously refine user behavior predictions, which powers intelligent chatbots and agents to operate autonomously without human intervention.

MATERIALS AND RESEARCH RESULTS. When initiating digital transformation, SMBs must start with processes that are highly routine, rule-based, and rely on structured data, as attempting to automate chaotic or poorly documented processes inevitably leads to scaled inefficiencies. In the finance and accounting sector, prioritizing the processing of incoming invoices, bank reconciliation, and automated payment routing can cut financial document processing time by up to seventy percent while eliminating manual data entry typos. Within the domain of sales and marketing, automated lead routing from advertising platforms directly to the CRM system ensures immediate manager assignment and enables the auto-generation of contracts the moment a deal is closed [16]. Human resources departments significantly benefit from automated employee onboarding, access provisioning, and preliminary resume screening performed by AI bots. Furthermore, operational logistics and IT teams can automate the transfer of data from e-commerce carts directly to enterprise resource planning systems, generate shipping waybills, update real-time stock, and route helpdesk tickets seamlessly to ensure uninterrupted business continuity.

Choosing the appropriate software platform depends heavily on an organization's existing technological stack, budget constraints, and internal technical expertise. A comparative analysis of automation platforms for small and medium-sized enterprises is presented in Table 1.

Table 1 – Comparative Analysis of Automation Platforms for SMBs

Criteria	Zapier	Make (Integromat)	UiPath
Platform Type	Cloud-to-cloud iPaaS	Cloud-to-cloud iPaaS	Traditional RPA
Target Audience	Marketers, non-technical users	Users with basic technical skills	IT specialists, developers
Number of Integrations	8000+ ready connectors	1500+ connectors	Limited number of ready connectors
Setup Complexity	Very simple (Low-code/No-code)	Medium (visual editor)	Complex (requires programming)
Automation Type	API-based integrations	API + complex data processing logic	GUI-based (simulating user actions)
Complex Logic Support	Limited (linear processes)	High (mathematical iterations, JSON)	Very high
Legacy Systems Support	No (APIs required)	No (APIs required)	Yes (can work without APIs)
Implementation Cost	Low (subscription)	Low (subscription)	Very high (25-30% of TCO - license)
Infrastructure	Not required (fully cloud-based)	Not required (fully cloud-based)	Required (servers, DevOps)
Scaling	Easy, but expensive at high volumes	Cost-effective at high volumes	Complex and expensive
Time to Implementation	Hours/days	Days/weeks	Months
Support & Maintenance	Minimal (automatic updates)	Minimal (automatic updates)	High (constant technical support)

Zapier is an ideal solution for quick marketing tasks due to its ease of setup and vast library of connectors; however, its limited support for complex logic and high cost at large volumes make it less attractive for scalable operations.

Make offers an optimal balance between visual convenience and powerful data processing, allowing for the construction of complex computational scenarios without significant infrastructure costs, while remaining cost-effective even under high loads.

UiPath provides maximum flexibility and the ability to work with any legacy systems at the graphical interface level, but this power comes at the cost of high implementation complexity, the need for constant technical support, and significant financial expenses.

Zapier represents a cloud-to-cloud integration platform ideal for quick wins and marketing-focused tasks. Designed for non-technical citizen developers, it offers an intuitive interface and a massive library of over eight thousand application connectors, which drastically reduces technical debt through automatic vendor updates. However, it can become rigid and prohibitively expensive when handling highly complex, multi-level mathematical branching at massive transaction volumes. Alternatively, Make, formerly known as Integromat, provides an unlimited visual canvas specifically suited for complex computational logic. It natively supports advanced data structure manipulation, mathematical iterations, and JSON unflattening, effectively acting as a powerful backend orchestration tool for businesses. Despite its financial accessibility for large operation volumes, Make presents a steeper learning curve that requires fundamental algorithmic thinking. On the other end of the architectural spectrum, UiPath serves as a traditional RPA tool designed to integrate at the visual user interface level, mimicking human actions like clicks and screen scraping. This functionality makes it absolutely essential for businesses relying on legacy software, high-security banking terminals, or government registries that lack open application programming interfaces. Nevertheless, GUI-based robotization is architecturally brittle, requires specialized software developers, and carries the highest total cost of ownership, with enterprise deployments often scaling into tens of thousands of dollars monthly.

A common misconception among business leaders is equating the software subscription cost with the total project implementation cost.

For traditional RPA systems like UiPath, direct licenses often constitute only twenty-five to thirty percent of the total cost of ownership, while the remaining majority is consumed by infrastructure deployment, code development, and constant technical maintenance. Cloud integrations like Make and Zapier require virtually zero local infrastructure costs and offer a much faster path to profitability. A successful implementation roadmap should strictly follow sequential phases. It must begin with deep process discovery to document the current state, followed by technical feasibility assessments and tool selection. Subsequently, development should start with a small proof of concept focused on simple tasks, undergo rigorous stress testing, and be accompanied by empathetic change management. Ultimately, establishing an internal center of excellence guarantees the continuous monitoring and scaling of the automation initiatives.

CONCLUSIONS. To ensure the success of an automation program, businesses must strictly avoid automating broken or inefficient processes without conducting thorough prior re-engineering. It is also crucial to avoid the syndrome of expecting an instant return on investment by attempting to automate every complex edge case from day one; instead, the focus should remain on the most repetitive, linear transactions. Furthermore, data governance must be prioritized by securing credentials in enterprise vaults rather than hardcoding passwords. Looking to the near future, the industry landscape is rapidly shifting from rigid, linear robotic process automation toward autonomous Agentic Artificial Intelligence. Powered by large language models, these software agents can understand overarching business goals via natural language prompts, autonomously plan multi-step actions, dynamically select necessary application programming interfaces, execute tasks, and

self-correct errors in real time. Platforms such as Zapier and Make are already deeply integrating these agentic capabilities into their visual builders. This technological evolution permanently lowers the barrier to entry, empowering small and medium businesses to build highly adaptable, autonomous digital workforces that can drive sustainable growth and maintain a competitive edge.

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