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# AGILE AND DEVOPS TOOLS IN BUSINESS PROCESS MANAGEMENT

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## ІНСТРУМЕНТИ AGILE ТА DEVOPS В МЕНЕДЖМЕНТІ БІЗНЕС-ПРОЦЕСІВ

***In today's world, customers are becoming increasingly demanding, expecting personalized service and quick responses from companies to meet their needs. Businesses need to rethink their approaches to product development to meet expectations. Agile and DevOps methodologies enable product creation that meets customer needs and delivers them to the market faster than competitors. Therefore, this article explores the core Agile and DevOps tools in business process management. The study emphasizes that the context of Agile and DevOps methodologies is shaped by an environment where product development processes and the management of these developments proceed most efficiently. At the same time, the Agile context in business process management is shaped as an instrumental environment that adjusts the implementation and application of innovations based on Agile principles. The DevOps context in business process management is shaped as an instrumental environment that transforms the culture and establishes practices that communicatively unite product developers and operations teams. This collaboration aims to ensure the rapid and reliable release of new products and their delivery to the market. The synthesis of Agile and DevOps methodologies creates an "ecosystem" shaped by various factors, both internal to the company and external-market-driven influences. Agile and DevOps have a positive impact on product quality, time to market, and the ability to adapt to changes. It has been proven that business entities can develop and release new products or features more quickly, allowing them to respond promptly to market changes. The Agile and DevOps implementation in organizations leads to significant changes in business processes and management styles by increasing flexibility, reducing costs, and improving collaboration among project teams. Based on the conclusions drawn, the prospects for further research lie in a thorough analysis of the impact of Agile and DevOps on various industries. In particular, it is important to investigate how their tools impact the specifics of different economic sectors (such as finance, healthcare, and manufacturing) and which implementation features are most effective in each particular case.***

У сучасному світі клієнти стають все більш вимогливими, очікуючи від бізнесу індивідуального підходу та швидкого реагування на свої потреби. Щоб задовольнити ці очікування, його суб'єктам потрібно переглянути свої методи розробки продуктів. Методології Agile та DevOps дозволяють створювати продукти, що відповідають потребам клієнтів, і доставляти їх на ринок швидше, ніж конкуренти. Методології Agile та DevOps дозволяють створювати продукти, які відповідають потребам клієнтів, і доставляти їх на ринок швидше, ніж конкуренти. Мета статті полягає у вивченні основних інструментів Agile та DevOps у менеджменті бізнес-процесів. У межах дослідження підкреслюється, що контекст методологій Agile та DevOps формує середовище, в якому процеси розробки нових продуктів та управління цими розробками відбуваються найбільш ефективно. При цьому контекст Agile у менеджменті бізнес-процесів формує інструментальне середовище, яке коригує впровадження та застосування новацій відповідно до Agile-принципів. Контекст DevOps у менеджменті бізнес-процесів формує інструментальне середовище, яке трансформує культуру та формує практику, що комунікативно об'єднує розробників продуктів та операційних виконавців з метою швидкого та надійного випуску нових продуктів і їх виведення на ринок. Синтез методологій Agile та DevOps є своєрідною "екосистемою", що формується під впливом різних факторів, як внутрішніх для компанії, так і зовнішніх — ринкових. Agile та DevOps мають значний позитивний вплив на якість продуктів, час їх виходу на ринок та здатність адаптуватися до змін. Доведено, що суб'єкти бізнесу можуть швидше розробляти та випускати нові продукти або функції, що дозволяє їм оперативніше реагувати на зміни на ринку. Впровадження Agile та DevOps у бізнесі призводить до значних змін у бізнес-процесах та стилі управління, завдяки збільшенню гнучкості, зменшенню витратності та покращенню співпраці між проектними командами. Відповідно до сформульованих висновків, перспективи подальших досліджень полягають у глибокому аналізі впливу Agile та DevOps на різні галузі промисловості. Зокрема, слід дослідити, як їх інструменти впливають на специфіку різних секторів економіки та які особливості їх впровадження є найбільш ефективними в кожному конкретному випадку

*Key words: product development; project; customer requirements; internal processes; business process; physical products with software; services.*

*Ключові слова: розробки продуктів; проект; вимоги клієнтів; внутрішні процеси; бізнес-процес; фізичні продукти з програмним забезпеченням; сервіси.*

## PROBLEM STATEMENT

Modern businesses operate in an environment of high uncertainty, which requires companies to continuously adapt to changing market conditions. Businesses must rapidly develop and launch innovative products to maintain competitiveness and meet customer demands. In this context, Agile and DevOps methodologies provide indispensable tools. Originally developed for the IT sector, they are increasingly being applied in other industries, transforming traditional project management approaches and providing flexibility and speed in product development.

## THE ANALYSIS OF RECENT RESEARCHES AND PUBLICATIONS

Today, various tools for improving business process management are actively being researched. For instance, Krapkin O., Kindrat O., and Chohey R. focus on the potential of DevOps, while Halushka Z. I., Suduk O. Yu., and Shcherbakova A. S. analyze the effectiveness of Agile approaches in the context of business process management. Bannikov V., Lobunets T., Buriak I., Maslyhan O., and Shevchuk L. are actively studying the features of using tools such as test automation, continuous integration, and delivery pipelines, as well as the use of containerization to enhance the flexibility and scalability of business

processes. It is worth noting that numerous studies on new tools and their role in organizing and optimizing business processes in management have already established a substantial knowledge base regarding their use. Researchers rarely consider integrating Agile and DevOps tools in business process management in the future.

## PURPOSE OF THE ARTICLE

This article explores the core Agile and DevOps tools in business process management.

## THE PAPER MAIN BODY WITH FULL REASONING OF ACADEMIC RESULTS

The study emphasizes that the context of Agile and DevOps methodologies creates an environment where developing new products and managing these developments occur most effectively [1]. In this context, the Agile framework in business process management is shaped as an instrumental environment that adjusts the implementation and application of innovations based on Agile principles [3—4]. The DevOps context in business process management is established as an instrumental environment that transforms culture and creates practices that communicatively unite product developers and operations teams, aiming for the rapid and reliable release of new products

**Table 1. Core elements of the Agile and DevOps context in business process management**

| Core element           | Element characteristic                                                                                                                                               | Features of influence on the choice of Agile and DevOps methodologies                                                                                                                                   |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project type           | The development of mobile applications, web services, and enterprise systems—each project type has its own characteristics that influence the choice of methodology. | Agile methods are better suited for fast, iterative projects (such as mobile applications). For large, complex systems (like enterprise systems), a combination of Agile and Waterfall may be necessary |
| Team size              | Small, medium, or large teams require different approaches to work organization.                                                                                     | Small teams can be more flexible, while larger teams may require more formalized processes.                                                                                                             |
| Technology stack       | The use of different technologies (programming languages, frameworks, tools) influences the choice of Agile and DevOps practices.                                    | The choice of automation tools depends on the technologies being used.                                                                                                                                  |
| Organizational culture | Corporate culture, values, and traditions all shape the context in which teams will operate.                                                                         | A culture that promotes innovation, collaboration, and continuous improvement is better suited for Agile and DevOps.                                                                                    |
| Customer expectations  | Customer expectations regarding delivery speed, product quality, and their involvement in the development process.                                                   | High customer expectations regarding delivery speed stimulate the use of Agile and DevOps.                                                                                                              |
| Market conditions      | Competition, the speed of market changes, and regulatory requirements.                                                                                               | High competition and rapid changes demand the flexibility provided by Agile and DevOps.                                                                                                                 |

Source: formulated by the author based on [1—2; 4].

**Table 2. Characteristics of core Agile tools based on their influence on the format of business process management**

| Core Agile tools        | Element format          | The influence of tools on the format of Agile methodologies in business process management                             |
|-------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|
| Business culture        | Readiness for change    | The ability of a business entity to depart from traditional management methods and adopt more flexible approaches      |
|                         | Collaboration and trust | The presence of a culture of open communication, mutual support, and trust among team members within the organization. |
|                         | Customer focus          | Employees' understanding of the importance of meeting customer needs and quickly responding to their changes.          |
| Project type            | Complexity              | A list of challenges may arise when applying Agile.                                                                    |
|                         | Size                    | Requirements for additional tools and processes for management                                                         |
|                         | Domain                  | Specific development requirements that need to be considered                                                           |
| Team size               | Self-organization       | The team's ability to self-organize and take responsibility for the results of their work                              |
|                         | Communication           | Communication channels within the team                                                                                 |
|                         | Diversity               | Roles and competencies represented in the team                                                                         |
| Technologies            | Tools                   | Tools used for project management, progress tracking, and communication                                                |
|                         | Infrastructure          | Necessary infrastructure to support Agile processes (e.g., cloud services, version control systems).                   |
| Customer (target)       | Engagement              | Client involvement in the development process                                                                          |
|                         | Changes in requirements | Frequency of changes in customer requirements                                                                          |
| Regulatory requirements | Standards               | A list of standards or regulations that must be adhered to                                                             |
|                         | Compliance              | Requirements for compliance with specific rules and procedures                                                         |
| Internal processes      | Planning                | Methodology for project planning within the business entity                                                            |
|                         | Progress tracking       | Methodology for tracking project progress based on key performance indicators                                          |
|                         | Performance evaluation  | Methodology for evaluating project results                                                                             |

Source: formulated by the author based on [3—4].

and their introduction to the market [1—2]. The synthesis of Agile and DevOps methodologies creates a unique "ecosystem" shaped by various factors, both internal to the company and external-market-driven influences. Thus, it is important to note that the context of Agile and DevOps methodologies in business process management is significant because it ensures [1—2; 4]:

1. Effectiveness. Agile and DevOps are not universal solutions for all problems related to business process organization. Moreover, the effectiveness of business process organization directly depends on the way they are integrated by managers, particularly in terms of considering the specific context of the business.

2. Adaptation. Agile and DevOps methodologies entail a high degree of flexibility and adaptability to change. Hence, in business process management, any adjustments should take place within a standardized framework.

3. Project Success. Understanding the context

helps avoid many mistakes when implementing Agile and DevOps. In business process management, this increases the likelihood of project success.

Considering that business process management encompasses a wide range of interconnected activities aimed at developing new products by a business entity, the content is quite broad. It can include the development of software (such as mobile applications, web applications, enterprise systems), hardware (such as Internet of Things (IoT) devices, sensors, smart devices), services (cloud services, e-commerce platforms), and physical products with software (for example, self-driving cars), among others.

Thus, the core elements of the Agile and DevOps context encompass (see Table 1) project type, team size, technology stack, business culture, customer expectations, and market conditions. Each of the components has a unique impact on the choice of Agile and DevOps methodologies in business process management.

The specificity of influence is determined by the core tools of the Agile and DevOps formats.

So, Agile is a flexible project management methodology that is gaining increasing popularity across various business sectors. It focuses on rapid adaptation to change, close collaboration among teams, and continuous improvement [3–4]. Consequently, Agile encompasses core tools such as business culture, project type, team size, technologies, customers, regulatory requirements, and internal processes (see Table 2).

In this regard, the influence of Agile on the format of business process management lies in the fact that, instead of large, long-term projects, managers strive to break them down into smaller iterations (sprints). It allows for quicker project results, change adaptability, and early customer feedback. For example, instead of developing a large product over six months, the team can create a minimum viable version in a few weeks and continuously improve it based on user feedback. Agile allows for rapid adaptation to changes in customer requirements and market conditions [1]. Consequently, business processes may evolve during project execution, which demands flexibility from all participants in the process. Specifically, if a new competitive offering arises during product development, the team can swiftly alter the process and direction to remain competitive development.

Regarding DevOps, it is a methodology for managing communication between product developers and operations specialists to bring products to market. The implementation of DevOps requires a comprehensive approach and consideration of numerous factors that

**Table 3. Characteristics of core DevOps tools based on their influence on the format of business process management**

| Core DevOps tools | Element format          | The influence of tools on the format of DevOps methodologies in business process management                           |
|-------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Creative culture  | Collaboration and trust | Building relationships between developers, operations specialists, and other stakeholders                             |
|                   | Readiness for change    | Openness to new tools, technologies, and approaches                                                                   |
|                   | Customer focus          | Focus on meeting customer needs and quickly responding to their requirements                                          |
|                   | Continuous improvement  | Continuous process optimization and exploration of new opportunities                                                  |
| Technology stack  | Automation tools        | Use of tools for automating product development processes, product testing, and deployment for market sales           |
|                   | Cloud technologies      | Transition to cloud platforms to enhance scalability and flexibility in new product development processes             |
|                   | Containerization        | Utilization of containers (e.g., Docker) to standardize the product development environment.                          |
| Processes         | Continuous integration  | Automatic integration of incremental changes to the product into the main production process.                         |
|                   | Continuous deployment   | Automatic scaling of incremental changes into the production environment.                                             |
|                   | Monitoring and logging  | Continuous monitoring of the status of modified production systems and data collection for analyzing their condition. |
| Business goals    | Speed to market         | Reduction of time from idea to implementation                                                                         |
|                   | Product quality         | Ensuring high quality of software and hardware.                                                                       |
|                   | Scalability             | The ability of the production and management system to handle increased loads                                         |
|                   | Reliability             | Minimization of downtime and ensuring continuous operation of production and management systems                       |
| Security          | Data protection         | Implementation of measures to protect project data from unauthorized access.                                          |
|                   | Compliance              | Compliance with regulatory requirements                                                                               |
| Культура відмов   | Root cause analysis     | Incident analysis to identify their causes.                                                                           |
|                   | Ongoing improvement     | Utilizing acquired knowledge to prevent the recurrence of mistakes                                                    |

Source: formulated by the author based on [1; 5–6].

shape its context. Thus, DevOps encompasses core tools such as creative culture, technology stack, processes, business goals, security, and a culture of failure (see Table 3). It is important to understand that DevOps tools are dynamic and change over time.

The influence of DevOps on the business process management format lies in effective communication environment creation between product developers and operations personnel, facilitating changes in production activities and interactions among various departments [5]. Continuous integration and continuous deployment automate the process of delivering changes to the production environment, reducing the risk of errors and accelerating the release of new products.

The utilization of the diverse tools outlined for Agile and DevOps results in business processes built on their foundation, along with their inherent management, being particularly effective.

Specifically, regarding products, Agile and DevOps ensure:

- Rapid releases and new service capabilities. For example, personalized recommendations, integration with delivery services, or new payment methods every week. It enables the business entity to quickly respond to market changes and user needs, maintaining a competitive advantage.

- Higher quality. Through automated testing and continuous monitoring, products developed using Agile and DevOps have fewer defects and enter the market at a higher quality. For instance, an online store that utilizes DevOps can ensure that its website operates quickly and smoothly while the checkout process is intuitive for users.

- Reduced time to market. The rapid release of new products or features enables companies to generate revenue faster and increase their market share. For example, a business entity developing a new type of gadget can launch it in the market ahead of competitors, thus gaining an advantage.

Regarding business processes in management, Agile and DevOps guarantee:

- Greater flexibility. Agile and DevOps enable production processes to easily adapt to changing customer requirements and market conditions.

- Improved collaboration among project teams. Agile and DevOps promote the creation of cross-functional teams where product developers, testers, designers, and other specialists work together. It enhances communication and allows for quicker problem-solving.

- Reduced costs. Automation of business processes and resource optimization help lower expenses related to product development and maintenance. For instance, utilizing cloud services allows for scaling infrastructure management according to demand, thereby reducing costs for hardware and maintenance.

## CONCLUSIONS FROM THIS STUDY AND PROSPECTS FOR FURTHER EXPLORATION IN THIS DIRECTION

The use of various Agile and DevOps tools enables businesses to organize management processes in a way that creates higher-quality, more flexible, and innovative products. In this regard, the following conclusions have been made about the specifics of using Agile and DevOps tools in business process management:

1. Agile and DevOps have a significant positive impact on product quality, time to market, and the ability to adapt to changes. Thanks to automation and an iterative approach, businesses can develop and release new products or features more quickly, allowing them to respond promptly to market changes. Thanks to automated testing and continuous monitoring, high product quality is ensured (reducing defects and increasing user satisfaction). The ease of adapting products to changing market conditions and new customer requirements enhances their competitiveness.

2. The Agile and DevOps implementation within organizations leads to significant changes in business processes and management styles by increasing flexibility, reducing costs, and enhancing collaboration among project teams. Routine task automation, optimization of resources, and reduction of task execution time enhance the overall efficiency of business processes. The formation of cross-functional teams promotes more effective communication and

collaboration among different departments. Additionally, the automation and optimization of processes help reduce the costs associated with product development and maintenance.

Based on the conclusions drawn, the prospects for further research lie in a deep analysis of the impact of Agile and DevOps on various industries. Specifically, it is worth investigating how their tools affect the specifics of different sectors of the economy (for example, finance, healthcare, manufacturing) and which implementation features are most effective in each particular case.

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