Integration of Agile and DevOps Methodologies for Project Management of Developing a Safety-Oriented Logistics Information System for Managing Organizational Resources using Artificial Intelligence

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Abstract

In the conditions of rapid technological development and growing competition, effective risk management becomes critical for the success of IT projects. DevOps offers new approaches to ensuring software quality and security. The role of artificial intelligence, agile IT project management methodologies, and project, program, and portfolio lifecycle management in modern project management is examined. It is concluded that the combination of these approaches increases adaptability, accuracy, and management efficiency, which is important for the successful implementation of projects in a dynamic technological environment. The impact of modern development methodologies on the speed of delivery of security-oriented IT projects and their quality improvement is analyzed. Special attention is paid to methods that allow for the rapid creation and improvement of information systems, adapting them to the changing needs of stakeholders. The results of the study can be used to develop effective strategies for the development of logistics information systems. The combination of artificial intelligence, agile methodologies and effective management of project, program and portfolio life cycles forms a new approach to project management that meets the challenges of today. These tools provide high adaptability, accuracy and management efficiency, which is becoming critically important in a rapidly changing technological environment. The implementation of such approaches increases the chances of project success. Thus, project procurement management is a key area of knowledge in project management, which ensures the successful achievement of project goals through the effective involvement of external resources. A comprehensive model of integration of Agile and DevOps methodologies is proposed, adapted for managing an IT project for the development of a security-oriented logistics information system with elements of artificial intelligence, which provides increased flexibility, speed of development and the level of security of the end-to-end project life cycle.

Keywords

Agile and DevOps methodologies. AI, machine learning in IT projects; integration of methodologies, security-oriented logistics information systems

1. Introduction

The development of project management is directly related to innovations in the security sector, which stimulate scientific progress and new approaches to the implementation of complex tasks. The existing level of digitalization of logistics systems of security-oriented organizations to support management decision-making in Ukraine is insufficient. The application of process automation to the organization and management of logistics is a priority task of the security sector in the context of Russia's military aggression against Ukraine.

The choice of digital tools for logistics is important in the context of international cooperation and joint security projects and programs for forecasting, provisioning and control of material and technical resources.

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It has been established that the problematic issues of security-oriented organizations are the ability to manage human resources in real time, analyze their needs simultaneously with a large amount of data, make informed decisions, plan and monitor resources, and make purchases for the needs of security-oriented project teams and defense forces.

Training programs for logistics and logistics specialists in the civil protection sector of the EU countries include the basics of security, management methods for organizing and managing logistics (logistics) in peacetime and wartime, planning, financial and food supply, procurement control, crisis and operational management, special technical and automotive support, international humanitarian law, as well as the introduction of standards and decision-making procedures according to NATO standards into the educational process.

The relevance of international support for Ukraine against the backdrop of constant armed attacks from Russia is constantly growing. Despite the assistance of international partners, the units of the State Emergency Service of Ukraine will continue to need humanitarian assistance and equipment with special equipment. Logistics is an important element of the EU Civil Protection Mechanism. It ensures effective resource planning, organization and coordination of the delivery of humanitarian aid to the affected regions. The logistical support of the security sector is the key and basis for stability in martial law.

A key component of the functioning of the European Union Civil Protection Mechanism is to foster a network of cooperation focused on knowledge sharing, capacity building and disaster response exercises. They provide Member States with logistical support and a platform to exchange experiences and innovative approaches to risk reduction, enabling them to learn from each other and implement successful strategies. Ukraine's accession to the EU Civil Protection Mechanism opens up new horizons for cooperation with European universities and academies in the field of training specialists in humanitarian logistics, emergency logistics and logistics chains in the security sector. Such a partnership can significantly improve the quality of education in Ukraine, provide access to modern knowledge and technologies, and contribute to the development of the material and technical base.

The Agreement on Ukraine’s Accession to the European Union Civil Protection Mechanism is expected to facilitate the mobilisation of assistance. Ukraine will also be able to benefit from other tools through more structured cooperation in disaster prevention and preparedness, for example through training and exercises within the framework of the EU Civil Protection Mechanism and cooperation with other international organisations that regularly provide training and courses for logistics professionals. This process significantly increases the need for highly qualified logistics professionals in the security sector to coordinate humanitarian assistance from partner countries, manage procurement and perform other functional responsibilities assigned to them.

Training logistics and logistics specialists in the civil protection sector is an important aspect that will contribute to the security of the state. Thanks to the development of international cooperation and new technologies, this industry is constantly developing, offering newopportunities for professional growth and upgrading of qualifications on the basis of higher education institutions with specific training conditions.

Information resources are an important subsystem in the context of organizational management, and information is a key element in logistics operations. An important task is to coordinate the requirements of stakeholders regarding the availability and allocation of resources for the implementation of logistics projects, management of procurement, supply chains, availability of material and technical stocks and interaction with suppliers. Organizations that invest in information systems gain a strategic advantage. Information systems help manage projects around the world.

2. Analysis of recent research and publications

In modern aspects of scientific research, emphasis has repeatedly been placed on the possibilities of using and influencing AI on project management in IT, various domestic and foreign scientists have

paid special attention to this in their works. The transformational impact of AI on project management was highlighted in their works [24], focusing on the organizational challenges of implementing AI. According to a study by Gartner, 80% of project management tasks will be performed using generative AI, which works on the basis of natural language processing from big data. The profession of project manager can be replaced by AI technologies, with the help of which it is quite possible to prioritize projects, generate reports and circulate information. Given the active development of digital technologies and the growing interest in innovative solutions in the field of project management, the issue of integrating artificial intelligence (AI) systems into the practical activities of project management in IT becomes particularly relevant.

BCG consultants using AI completed 12.2% more tasks, completed them 25.1% faster, and produced results that were over 40% higher quality than those not using AI. Technologies for process automation, improved customer interaction, and data analysis are being actively adapted to Ukrainian businesses. Stakeholders are investing in the development of artificial intelligence and its integration into business processes. The growth in revenues of companies using generative AI in 2024 was an average of 6%. AI is most often used in marketing, but generative AI is also growing rapidly in the IT sector. Project management software companies are integrating AI into their IT products, such as Notion, Clickup, and PMI Infinity.

In [1], an adaptive mathematical model is presented that represents the symbiotic combination of innovations in the era of the explosion of artificial intelligence for a synergistic effect in order to optimize the project outcome. The concept of syncretism in the context of combining different methodologies and technologies is revealed. The process of integrating artificial intelligence for the purpose of iterative improvements, optimization and allocation of resources at different stages of project life cycle management is also investigated. Artificial intelligence has a powerful potential in the development of project management, namely: managing stakeholder expectations, managing conflicts to achieve project goals, improving planning processes, tracking the progress of work and monitoring the project as a whole. Syncretic management in the era of convergence of innovations and the development of artificial intelligence affects the paradigm of project management. The development of artificial intelligence and the need to improve flexible management require further research.

At work the integration of the DMAIC (Define, Measure, Analyze, Improve, Control) process of the Six Sigma methodology into the Scrum methodology is analyzed. Modern IT software development projects require flexibility, rapid development, and quality of products that are released. The convergence of methodologies provides a synergistic effect for managing complex projects. The paper presents a conceptual hybrid Scrum-DMAIC model for improving software development processes. The combination of flexibility with a structured approach helps to more quickly eliminate potential problems that may arise during the project implementation and product operation.

In labor an example of a successful integration of the Scrum-Six Sigma hybrid model in a software development company was analyzed. As a result, the organization was able to reduce the time to fix defects by 30% and reduce the overall number of defects by 25%.

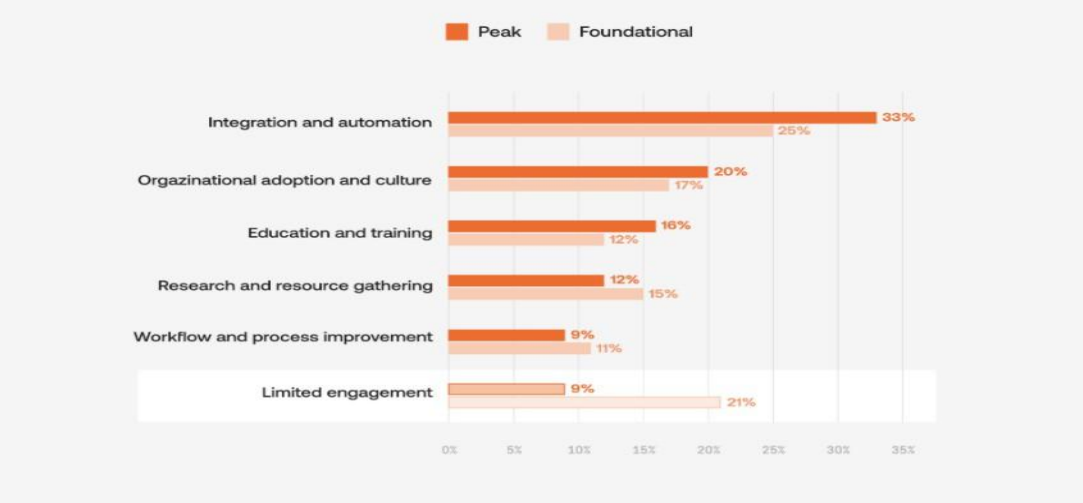

Figure 1: Actions to advance GenAI for project management [Source: PMI.org]

Integrating DevOps methodology into large IT projects is a complex process, but it allows you to more effectively implement tasks within the deadlines set by the calendar plan. The article

[18] examines the main components of integration, continuous product delivery and process automation to improve teamwork on an IT project. The analysis of the key components of continuous integration is carried out, which include automated compilation, module inspection, quality assessment, software product creation, feedback loop and configuration administration. The features of the fundamental procedures covered by continuous integration are investigated, namely: source code creation, autonomous verification, artifact generation, quality control, security inspection and artifact publication. The paper analyzes the use of the DevOps concept with Microsoft Azure cloud technologies. The analysis reveals structured parameters such as: infrastructure, monitoring, architecture, orchestration, logging, security, and integration. To optimize the IT project life cycle and deployment, the authors propose a microservice architecture. The integration of the DevOps methodology is aimed at improving the interaction of the software development project team and process automation for effective IT project management [18].

However, there are challenges and risks that can affect the success of implementing this framework: resistance to change, organizational constraints, team training, integration of DevOps tools, security components in the software development lifecycle. These challenges may require additional resources to manage changes in requirements and operations. To overcome them, it is necessary to ensure process security, develop an organizational culture and adapt it to DevOps practices, train specialists and teams [15].

The DevOps concept also aims to form cross-functional teams with different sets of competencies, which allows overcoming the tension stage for effective teamwork on an IT project. [Germany Scopus Devops team]. Authors of the work [14] developed the DevOps Culture Challenges Model (DC2M), which aims to reduce barriers and improve collaboration in project teams consisting of software developers and operations groups.

The paper developed a CI/CD platform model using Jenkins and Team City for continuous integration, deployment, and management of a software project. [10]. The platform allows for automated code analysis, execution, compilation, and deployment. To scale information infrastructures, organizations use cloud architecture for IT projects using the DevOps methodology, which promotes reliable and flexible operation of the IT product when users load the system.

At work [12] considered the possibilities of transforming the DevOps methodology, adapting this concept and culture to the challenges associated with integrating the approach into the cloud technology environment. In the work [11], research was conducted on the use of machine learning models to optimize operations management in DevOps. Artificial intelligence combined with cloud technologies and continuous improvement practices allow project teams to interact more effectively in the process of developing modern software. Machine learning models for managing logistics projects IS.

Products in the field of logistics information systems are rapidly developing in Ukraine and the world. Information as an important resource in projects is effectively used by stakeholders using various technologies. The current trend in the IT project management system is the use of both classical and flexible methodologies. The main approaches to combining different project management methodologies are: convergence, hybridization of methodologies and a syncretic approach, which allows combining methodologies for a portfolio of IT projects.

There are many management practices for improving processes in project activities of security-oriented organizations. For defense institutions and information system development projects, the best choice will be a combination of principles and practices from different frameworks, adapted to specific security needs and requirements.

In order to develop new logistics projects, the civil protection management has begun to apply the latest approaches in logistics processes and the first stage is the launch of the project to implement the Logistics Information System (LIS) of the company AURA S.R.O. (Czech Republic), which is a supplier of leading solutions in the field of information systems for logistics with a main focus on the defense and security industry, as well as the codification of equipment and property according to NATO standards. In the process of supplying software products of the Digital Logistics System of Civil Protection "Management services related to computer technologies", there is a need for education and training of logistics specialists. This program will become one of the main tools for digitalizing logistics in civil protection and will provide logistical planning not only for international assistance, but also for the full range of resources available in civil protection. The purpose of logistical planning is to identify civilian capabilities that are necessary for the deployment of support forces and assets

for civil protection.

Ukraine is also integrating security sector components and structures with Euro-Atlantic security-oriented systems. The paper [9] analyzed the feasibility of implementing the NATO LOGFAS information logistics support system in the activities of the State Border Service of Ukraine. A roadmap is being implemented for the use of the automated logistics support system of the LOGFAS (Logistic Functional Area Services) information system in order to ensure transparency and control of defense resource supplies, which is used in NATO member states. NATO defines logistics as the science of planning and executing the movement and maintenance of forces. It is vital to any military operation, and without it operations cannot be conducted and sustained. One of the key principles of NATO logistics is the principle of collective responsibility, which encourages countries and NATO to jointly share the provision and use of logistical capabilities and resources.

The automated LOGFAS (Logistic Functional Area Services) system is designed to unify logistics operations, interoperability according to common standards of NATO member countries, optimize the management of national resources, their effective command coordination, accelerate logistics flows and support decision-making. It is also a logistics operations support service, which integrates a set of software systems designed to support NATO logistics. LOGFAS is successfully used to support NATO logistics during operations and exercises. The LOGFAS logistics support system provides the processes of planning and implementing transportation and transport support, support planning and reporting on logistics support.

LOGFAS consists of various modules, namely:

1. GEOMAN (Geographical data management module) geoinformation subsystem – geography manager;
2. LDM analytical module (LOGFAS Data management Module) for data analysis and report generation;
3. NATO resource optimization software, ADAMS (Allied commands resource optimization software system) module for coordinating forces and logistics;
4. CORSOM (Coalition reception, staging and onward movement) module for improving technological processes, planning, analyzing and eliminating problematic issues, and monitoring the actions of forces and assets;
5. “EVE” (Effective visual execution) module for vehicle prioritization and coordination; Resource distribution model "SDM" (Supply distribution module) - is a tool for decision-making by managers for the distribution of supplies and modeling scenarios for planning operations;
6. The sustainability planning model "SPM" (Sustainment planning module) is designed for planning operations support, strategic planning and creating inventories of material and technical resources.

At least the warehouse accounting should be structured by the German SAP IT system – S/4HANA. This is just one of the functions. SAP can keep track of and plan all material resources in general. The data will then be transferred to the LOGFAS database, where logistics operations will be planned.

The LOGFAS information system has a number of limitations related to the digitalization of logistics processes, which complicate projects related to its integration into Ukrainian security structures and organizations. These include: digitizing data from paper media at various tactical and strategic levels, ensuring the protection of the exchange of closed and confidential information, training and education of highly qualified personnel, and providing automated workplaces.

3. The bulk of research

Project, program, and portfolio lifecycle management becomes critical in the context of complex IT projects. The project lifecycle encompasses all stages from initiation to completion, and each requires careful planning and control. Program and portfolio management requires a broader approach that considers the interdependencies between projects, their impact on the business, and the organization’s strategic goals.

The life cycle model as a conceptual vision of the structure of the organization of this cycle includes the main stages and the principles of their interaction. The methodology, in turn, establishes a set of tasks, their detailed specification and the distribution of responsibilities between specialists at each stage of the selected life cycle model, defining the model itself and offering best practices for optimizing the use of the corresponding methodology and its model. The life cycle structure is an organized set of processes, works and tasks covering the stages of creation, application and support of an information system or software, starting from the formulation of needs and ending with decommissioning. For information systems, spiral, V- shaped and incremental models are effective.

Scott Ambler, the author of the concepts and practices of Agile Modeling and the Enterprise Unified Process (an extension of the Rational Unified Process), proposes the following levels of the life cycle, determined by the corresponding content of the work:

- software development life cycle - project activities for the development and deployment of software systems;
- software system life cycle - includes development, deployment, maintenance and support;
- information technology life cycle - includes all activities of the IT department;
- organization life cycle - covers all activities of the organization as a whole.

SWEBOK considers areas of knowledge related to the stages of system existence and the process of software creation. At the same time, as noted in SWEBOK, one of the basic approaches to understanding the life cycle is the standards that regulate it - ISO/IEC 12207 and IEEE.

To support resource management decision-making, various mathematical models can be used, depending on the specifics of the tasks:

- Optimization models - used to find the best solution among possible options, for example, minimizing costs or maximizing profits.
- Forecasting models - help predict future results based on data analysis, demand forecasting.
- Simulation models - allow you to model different scenarios and assess their impact on the system, modeling production processes.
- Multi-criteria models - used for making decisions that take into account several criteria at the same time, the balance between quality and costs.

Economic and mathematical models - used to analyze economic systems and processes, inventory management models.

These models can be integrated into information systems to automate the decision-making process. MRP (Materials Requirements Planing) – the main goal of this system is to minimize the costs associated with inventory in the warehouse. The use of this system allows you to optimize the supply plan for materials and components, thereby reducing production costs. KANBAN – a system that allows you to optimize the chain of planning production capacities, starting from demand forecasting, planning production tasks and distributing these tasks to production capacities with optimizing their loading. OPT (Optimized Production Technologies) is a production improvement system used to reduce bottlenecks, increase throughput, reduce inventory and, therefore, reduce overall production costs. DRP (Distribution Requirements Planning) is a system aimed at increasing the efficiency of resource delivery by determining which products, in what quantities and where, are needed to meet expected demand. Its goal is to minimize shortages and reduce the costs of ordering, transporting and storing resources.

Effective Frameworks for Information Systems Projects are: TOGAF, COBIT, Zachman, Agile and Waterfall Frameworks. Information systems design is a dynamic software development process that involves a project team of various specialists using a specific set of design tools. World leaders are: SAP, Oracle ERP Cloud, Microsoft Dynamics. ERP systems and programs optimize the organization's operational processes, provide real-time analytics, and help managers make informed decisions. WMS, in particular Logistics Vision Suite, is designed to effectively manage and optimize the use of all types of resources. It helps to effectively explore operations, coordinate the work of teams, optimize the use of infrastructure, and also provides information for making informed management decisions on the allocation and use of resources. There is no single "right" framework. The most effective approach for security-focused organizations and projects is a

hybrid approach that combines best practices from different frameworks. It is important to carefully analyze the specific needs of the project, security requirements, and organizational culture to develop an individualized project management methodology.

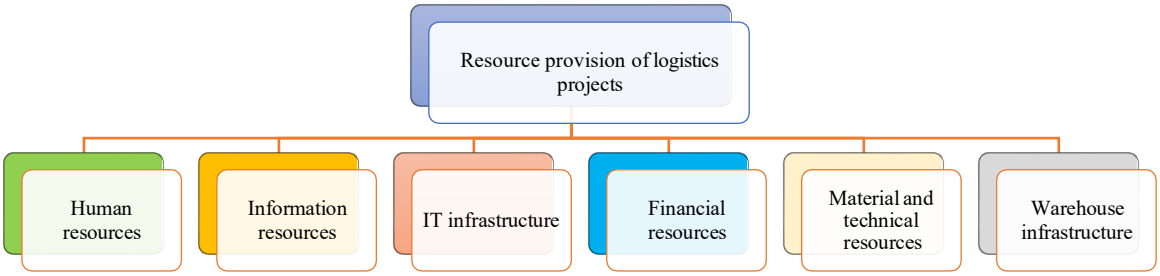

Figure 2: Resource provision of logistics projects

DevOps methodology aims to shorten the development life cycle of systems and ensure continuous delivery of high quality. For a logistics information system development project, DevOps becomes particularly relevant. The collaboration between developers and operations teams that DevOps offers significantly increases the speed, reliability, and efficiency of delivering innovative logistics solutions.

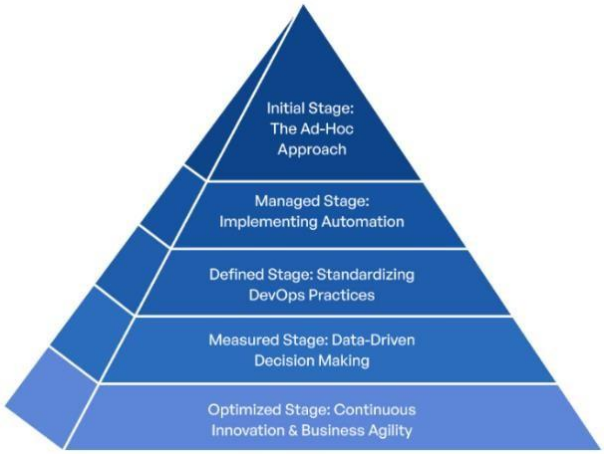

Figure 3: Key stages of DevOps maturity

Security management is the process of ensuring the security of the organization, its employees, assets and information. Information is not just a collection of data, but a strategic resource that determines the success of society and individuals in the 21st century. Its value lies in its ability to generate knowledge, innovate and create new opportunities. DevOps, a methodology that promotes collaboration between development and operations teams, inherently incorporates risk management principles. By automating processes, fostering continuous delivery, and emphasizing a culture of shared responsibility, DevOps significantly reduces the likelihood of risks and minimizes their impact. DevOps is a methodology that combines software development and software maintenance (operations).

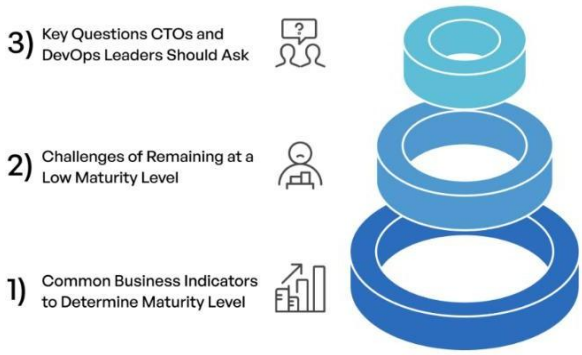

Figure 4: Steps to evaluate DevOps Maturity level

The main goal of DevOps is to shorten the development cycle, improve the quality of the software product and ensure its continuous delivery. Implementing DevOps can significantly improve software development and delivery processes, but it also comes with a number of challenges. DevOps requires close collaboration between developers and operations professionals, which can be difficult to achieve in traditionally structured organizations.

Table 1
Principles of DevOps

Principles	Characteristic	Advantages
Automation	As many processes as possible are automated, from code assembly to production deployment. This reduces manual operations that can lead to errors	Thanks to automation and close team collaboration, new features and fixes are delivered faster.
Team work	Developers and operations professionals work together as a single team. It improves communication, understanding and accountability	Continuous integration and testing help identify and fix bugs early in development.
Continuous integration and delivery	Code changes are continuously integrated and delivered to the production environment. This allows for faster detection and correction of errors	Automated processes and monitoring help ensure stable operation of systems.
Monitoring	Systems are constantly monitored to identify problems and improve performance.	DevOps allows you to quickly adapt to changing business requirements.
Infrastructure as code	The infrastructure is described in code, making it easy to create, modify and scale.	Teams can effectively collaborate on infrastructure code using version control systems.

Infrastructure as code is an approach to IT infrastructure management in which it is described using code. It allows you to automate the creation, configuration and management of resources such as servers, networks and storage. Migrating existing systems and data to a new infrastructure can be a time- consuming process.

Specific Risks and Mitigation Strategies:

- Optimize code and infrastructure for performance;
- Implement load testing to assess system capacit;
- Automate deployment processes to reduce human error;
- Implement strong security practices, such as encryption, access controls, and regular security audits.

Agile IT project management methodologies, such as Agile, Scrum, Kanban, etc., have long become a standard in the IT field. They allow you to adapt projects to changes, quickly respond to new customer requirements, and ensure high quality results. Agile methodologies focus on an iterative approach, where project development occurs in stages, which helps minimize risks and increase customer satisfaction. For example, the Agile methodology involves developing a product in small parts that are constantly improved based on customer feedback. This allows you to flexibly respond to changes and reduce the likelihood of errors in the early stages of development. Scrum, for its part, emphasizes teamwork, where regular sprints help effectively coordinate team actions and quickly eliminate shortcomings. The use of such methodologies in combination with AI contributes to a significant increase in team efficiency and project implementation speed.

In military structures, project teams use iterative and incremental approaches to developing IT products. The iterative process is based on the idea of breaking a complex task into small, manageable cycles (iterations). Each iteration includes planning, execution, testing, and evaluation. The result of each iteration is a certain part of the finished product or an improvement to an existing one. Several approaches need to be tested before a solution is found, and each attempt leads to a new understanding of the problem.

Agile approaches allow you to quickly adapt to changes, releasing updates in small iterations. Developing a logistics information system requires close cooperation between interested project participants. Agile facilitates this interaction, allowing you to receive regular feedback and make necessary adjustments. Agile methodologies help you focus on user needs, creating a product that truly meets their expectations. IT project portfolio management is a continuous process of creating strategic initiatives and improving them (Kaizen processes) to achieve sustainable results and increase value in the organization's activities. Agile allows you to change the direction of development if new ideas arise or priorities change. Project portfolio management includes groups of processes for ensuring management, portfolio formation, and a group for monitoring and controlling the project portfolio.

Regular updates and feedback are key to creating a product that users truly enjoy. The project manager should consider the number of potential channels or paths of communication as an indicator of the complexity of the project's communications. It is necessary to ensure constant communication and collaboration between development teams and representatives of the security organization.

Agile approaches, especially Scrum and Kanban, provide flexibility and the ability to quickly adapt to changing requirements. In the context of information systems development, this can be important for responding to new threats or emerging security requirements. Agile promotes early and frequent releases of working software, which allows for faster detection and remediation of potential vulnerabilities. Agile encourages close collaboration between the customer (representatives of the security organization) and the development team, which contributes to a better understanding of security requirements and their effective implementation.

Scrum, in particular, provides a high level of transparency regarding the progress of the project and existing issues, which is important for control and auditing in security projects. Collaborative work on the product backlog, Backlog management is a team effort of the Scrum team and up to 10% of the team time is allocated for this. A clear product backlog is a prerequisite for a successful sprint planning meeting. The product backlog is an ordered list of work required to develop a product, including a description of functional and non-functional requirements, as well as other components. Understanding the scope of backlog items helps to prioritize and plan releases (more accurate estimates of the complexity of tasks are provided during sprint planning meetings, and the tasks themselves and their estimates are documented in the sprint backlog). The product backlog is a dynamic structure that is constantly evolving and changing its content. Based on customer and user feedback, new items are identified and added to the backlog. Existing elements undergo modifications, their importance is reviewed, and they are continuously improved or removed.

Waterfall involves detailed pre-planning and documentation of all project phases. This is useful for projects with strict regulatory requirements and the need for increased monitoring and control. Clearly defined phases with formal checkpoints can facilitate control and approval at each stage, which is important for ensuring safety.

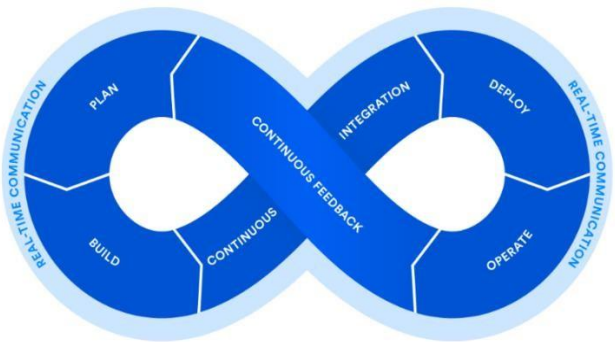

Figure 5: Agile pracices in DevOps

Security projects often have strict requirements for documentation, control and risk management, which is a strength of Waterfall. At the same time, the development of information systems requires flexibility and the ability to respond quickly to changes, which Agile approaches provide. The iterative Agile approach can be used to develop individual system components, while the Waterfall and DevOps framework can provide overall project management and control over compliance with security requirements. As well as the implementation of strict quality and security control procedures at each stage of development.

Table 2
Differences Between Agile and DevOps

	Waterfall	Agile	DevOps
Basic philpsophy	Systems are fully predictable and can be specified in advance. Assumes business needs remain broadly similar throughout project. Adjust schedule to preserve scope	Integrate business, dev and QA for radid delivery of software. Iterative 'sprint' cycles. Assumes priority of business needs may change. Adjust scope to preserve shedule	Cross-functional teams utilize automation to enable continuous deployment of change. Constant feedback loop. Adjust scope to preserve schedule
Documentation level	Comprehensive	Light	Light
Automation level	Low	Varied	High
Delivery of value	Slow – only at major milestones (3-6 months)	Rapid (daily/weekly)	Continuous
Business ownership of project?	No (typical)	Yes	Yes
Response to new business needs (flexible requirements)	Extremely limited due to detailed specification	Responsive– iterative delivery enables prioritization	Highly responsive cross-functional teams define business need more precisely
Colaboration	Low – teams operate in functional silos	Improved–busness is highly engaged, short dev cycles	High all stakeholders involved from project start
Quality	Low issues not identified until testing phase	Improved – issues Identified after every 'sprint'	High – automated unit testing during development
Risk	Increases as project progresses	Decreasess as project progresses	Decreasess as project progresses
Customer feedback	Infrequent – at project completion	Frequent – after every sprint	Continuous

Project portfolio management involves optimizing resources and balancing risks and benefits, which is extremely important for achieving the strategic goals of the organization. In this context, artificial intelligence can become a key tool for improving the efficiency of portfolio management. For example, the use of AI allows you to automatically analyze information about project performance, identify potential resource conflicts and suggest alternative options for their allocation. This helps project managers focus on strategic aspects of management and make informed decisions based on analytical data.

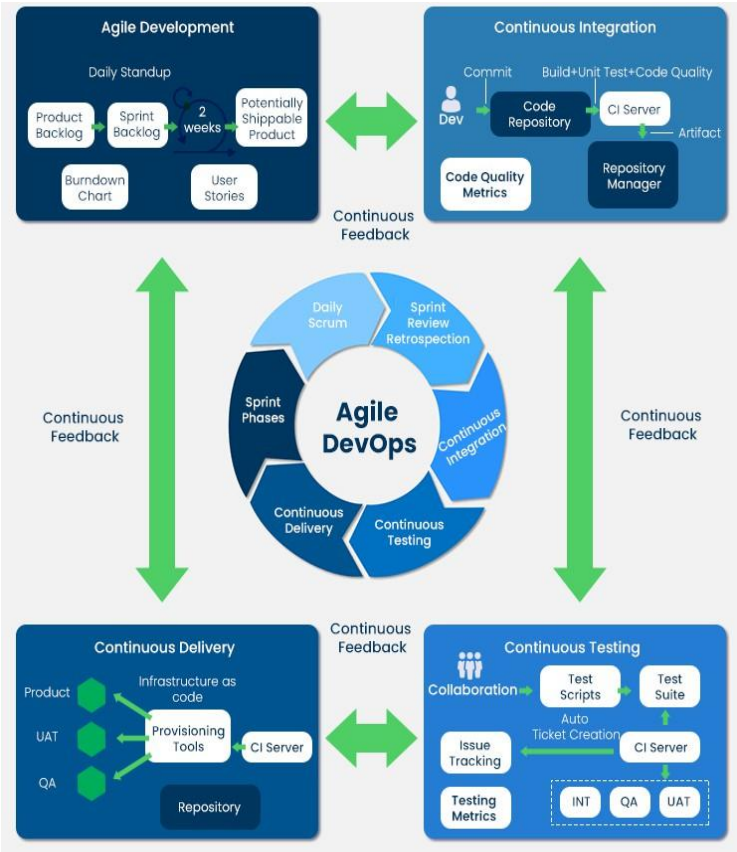

Figure 6: A framework template for integrating Agile and DevOps practices into IT project management for developing a security-oriented logistics information system

In the management system of security-oriented projects in the context of logistics and resource provision, procurement plays an important role. Project procurement management is one of the sections of project management, covering the processes of interaction with external stakeholders in order to obtain the necessary resources to fulfill the project objectives. Project managers are assigned functional responsibilities for planning, administration and contracts during project implementation, conducting tenders, as well as selecting suppliers and closing contracts. The procurement process allows you to set clear requirements for the quality of goods, services or work results and control their implementation. Information systems and artificial intelligence based on genetic algorithms have great potential for automating these operational processes.

Timely engagement of external resources is critical to meeting the project schedule. Procurement planning involves determining the project's external resource needs, developing a procurement strategy, defining contract types, and supplier evaluation criteria. This stage involves deciding what to purchase, when, in what quantities, and how. A project often requires specialized knowledge, equipment, or services that are not available within the organization. Procurement management ensures that they are obtained in a timely manner. Careful selection of suppliers and clear contracts minimize the risks associated with poor quality deliveries, delays, or non-fulfillment of obligations.

The full recovery of the Ukrainian economy is impossible without the reconstruction and modernization of the logistics infrastructure and training of personnel. Training logistics specialists in the security sector is a strategic step and an investment in the future of Ukraine. Partnership between higher education institutions and units of the State Emergency Service of Ukraine in the training of logistics specialists is mutually beneficial and will contribute to improving the quality of specialist training and ensuring the effective functioning of the civil protection system. This will ensure effective coordination of humanitarian aid and strengthen cooperation with international partners through the unification of logistics processes to the EU Civil Protection Mechanism.

4. Conclusions

Thus, the combination of artificial intelligence, agile methodologies and effective management of project, program and portfolio life cycles forms a new approach to project management that meets the challenges of today. These tools provide high adaptability, accuracy and management efficiency, which is becoming critically important in a rapidly changing technological environment. The implementation of such approaches increases the chances of project success. Thus, project procurement management is a key area of knowledge in project management, which ensures the successful achievement of project goals through the effective involvement of external resources. A comprehensive model of integration of Agile and DevOps methodologies is proposed, adapted for managing an IT project for the development of a security-oriented logistics information system with elements of artificial intelligence, which provides increased flexibility, speed of development and the level of security of the end-to-end project life cycle. An improved IT project management system for the development of a security- oriented logistics information system with elements of artificial intelligence is proposed, which includes integrated continuous integration and continuous delivery (CI/CD) processes, supplemented by automated security testing mechanisms and artificial intelligence tools for predicting and preventing potential threats.

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Declaration on Generative AI

The authors have not employed any Generative AI tools in the writing of this paper.

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