


Implementing an Agile Document Management System to Improve Efficiency and Compliance in the Cargo Industry

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Article Info	ABSTRACT
<p>Keywords: Document management, Agile Methodology, Cargo.</p>	<p>This research addresses efficiency and compliance issues in the cargo industry by implementing an Agile-based document management system. Common problems encountered, such as inefficient manual processes and the risk of document loss, are the main focus. The stages of system development, including requirements definition, planning, development, testing, and implementation, were analyzed in depth with an Agile methodology approach. The system could meet the expected functional, security, and performance needs through a series of tests. The results show the vital contribution of the Agile approach in improving efficiency and compliance in the cargo industry by implementing a document management system that is adaptive, efficient, and compliant with industry standards.</p>
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INTRODUCTION

The global economy relies heavily on the cargo industry as the backbone in facilitating the movement of goods from one location to another. The cargo industry is vital in providing global connectivity that enables international trade, distribution of goods, and efficient logistics services. With the continued growth of global trade, the cargo industry has become increasingly crucial in maintaining the smooth and efficient flow of goods (du Plessis et al., 2024; Hunt et al., 2023; Park et al., 2023; Tseremoglou et al., 2022; Vinje Kramer & Steen, 2022). However, behind the importance of the cargo industry's role, there is significant complexity in managing the documents associated with each stage of the freight forwarding process. The high volume of documents, ranging from invoices, contracts, and shipping documents to certifications and permits, poses challenges for cargo companies. The manual process, which is still dominant in document management, often needs to be improved to maintain operational efficiency.

Cargo companies often need help with document management. Time-consuming and error-prone manual processes are often an obstacle to achieving operational efficiency. In addition, locating and accessing required documents is a serious issue, especially in situations that require a quick response. Lack of document control and security also increases the risk of document loss or damage, which can impact delivery delays or loss of goods (Kim et al., 2021; Li et al., 2021; Malik et al., 2023; Romero-Silva & Mujica Mota, 2022; Yang et

al., 2023). In addition, cargo companies are also faced with difficulties meeting stringent industry regulations and standards, which require the maintenance of accurate and well-documented records.

In this context, cargo companies need to look for solutions that can improve the efficiency of their document management. Implementing a document management system based on Agile principles can be an effective solution to address the challenges faced by the cargo industry. With a more adaptive and responsive approach to change, an Agile document management system can help improve operational efficiency, increase document accessibility, improve control and security, and ensure compliance with regulations and industry standards. Therefore, this study aims to explore implementing an Agile document management system in the context of the cargo industry, with a focus on improving efficiency and compliance (Bombelli & Fazi, 2022; Camacho-Muñoz et al., 2023; Jörgensen et al., 2023; Lokras et al., 2022; Malmgren et al., 2023; Polkinghorne et al., 2024).

The negative impact of document management issues in the cargo industry is significant. A decrease in efficiency and productivity directly results from time-consuming manual processes and difficulty accessing necessary documents. When cargo companies cannot manage documents efficiently, it can disrupt workflows and cause delays in the delivery of goods, ultimately resulting in a decrease in overall productivity. In addition, increased operational costs can also occur due to manual processes that require more human resources and time for complex document management. Also, cargo companies are at risk of fines and sanctions due to non-compliance with applicable regulations and industry standards. Difficulties meeting stringent documentation requirements can lead to regulatory violations that could result in hefty fines and reputational damage. Damage to a company's reputation is also a severe impact of document management issues, as the inability to manage documents properly can reflect the company's unprofessionalism to its customers and business partners (Guo et al., 2022; Lim et al., 2021; Longo et al., 2022; Yıldız et al., 2023).

In the face of these complex issues, more than traditional approaches to document management are required. Therefore, innovative solutions are needed to address the challenges faced by cargo companies. The Agile approach offers an adaptive and change-responsive solution, which can improve efficiency and compliance in document management. By using Agile methodology to develop document management applications, cargo companies can experience significant benefits, including increased speed and flexibility in document management, improved document quality and security, and reduced overall operational costs. Through an Agile approach, cargo companies can optimize their document management processes to achieve better performance and meet the increasingly stringent demands of the industry.

As an innovative solution, the Agile approach offers a more adaptive framework that is responsive to changes in a dynamic business environment. In document management, the Agile approach enables cargo companies to develop and update their document management systems iteratively, focusing on delivering value to end users continuously. Using an Agile approach in the development of document management applications brings several significant benefits and advantages. Firstly, it can increase the speed at which systems are

developed and implemented, allowing companies to respond more quickly to market changes. The flexibility the Agile approach offers allows companies to adapt the system to dynamically changing business needs and requirements. Document quality and security can also be improved through the Agile approach. Continuous testing throughout the development process allows errors to be detected and corrected early, reducing the risk of data loss or corruption. In addition, the Agile approach also enables the integration of more robust security features into the system, thus protecting documents from unauthorized access or information leakage (Al-Saqqa et al., 2020; Dingsoeyr et al., 2019; Dingsøyr et al., 2012; Santos et al., n.d.; Serrador & Pinto, 2015; Shrivastava & Rathod, 2014).

Agile approaches can also help cargo companies improve compliance with applicable regulations and industry standards. By enabling rapid changes in response to regulatory changes, a document management system developed with an Agile approach can ensure that the company continues to meet the requirements set by the authorities. In addition, reducing operational costs is also one of the main benefits of using an Agile approach in developing document management applications. By reducing the time and resources needed to develop and maintain the system, cargo companies can save significant operational costs in the long run, increasing their profitability and competitiveness in an increasingly fierce industry.

This research will significantly contribute to solving document management problems in the cargo industry by proposing and analyzing the implementation of an Agile-based document management system. By introducing this innovative approach, this research is expected to provide an effective solution to improve efficiency, security, and regulatory compliance in document management in cargo companies. This research brings novelty and added value compared to previous research by combining two essential yet not fully explored fields: the cargo industry and Agile methodology in software development. Thus, this research will fill the knowledge gap in the literature by presenting a new outlook and practical approach to addressing document management issues in the cargo industry.

METHODS

This research involved four main stages in developing an Agile-based document management system for the cargo industry. First, the Needs Definition stage involved identifying and documenting the essential document management needs through stakeholder interviews and analysis of relevant regulatory documents. Second, the Planning stage involves forming a project team, determining the project scope, and allocating necessary resources. The third stage, Development, involved iterative system development based on Agile methodology, focusing on implementing basic document management features and regular functional testing. Finally, the Testing stage includes a series of functional, load, reliability, and acceptance tests to ensure that the system meets user requirements and established standards. This research will significantly improve efficiency and regulatory compliance in document management in the cargo industry by systematically following this process.

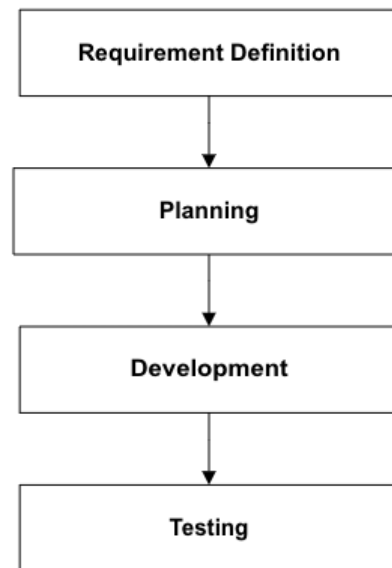


Figure 1. Research Stages

Definition of Need

The first phase, Needs Definition, begins by identifying the basic needs in document management, including document delivery, storage, and accessibility. This stage aimed to establish a strong foundation for further planning and Development through stakeholder interviews and analysis of relevant regulatory documents.

Planning

The next step is the planning stage, once the basic needs have been identified. Here, a project team consisting of members with appropriate expertise will be formed to address the various aspects of document management system development. The team will clearly define the project's scope, including the main functions to be included in the system, and allocate the necessary resources, such as personnel, budget, and time. Careful planning will ensure the smooth implementation of the project and the achievement of the desired goals.

Development

The next stage is Development, where the document management system will be developed iteratively based on Agile methodology. This process will start with creating a minimum functional prototype, which will be continuously updated and improved as the project progresses. Collaboration between the project team and stakeholders will be vital in determining the features that must be prioritized and refined. Implementing basic document management features, such as search, storage, and indexing, will be the main focus in this stage.

Testing

Finally, the Testing phase will evaluate the functioning of the document management system through a series of functional trials, load tests, security tests, and acceptance tests. Functional tests ensure that every feature and function runs as expected. In contrast, load tests will measure the system's efficient management of large volumes of documents. The

security test will guarantee that the documents stored in the system are well protected from unauthorized access or other security threats. The acceptance test will finally involve the end users to validate that the system meets their needs and expectations well. This Agile-based document management system can be successfully implemented in the cargo industry, improving efficiency and regulatory compliance by going through these four stages systematically and thoroughly.

RESULTS AND DISCUSSION

Definition of Need

The outcome of the Needs Definition phase involved the identification, documentation, and in-depth understanding of the basic needs in document management of the cargo industry. Through targeted interviews with various stakeholders in cargo companies, including operational staff, management, and legal or compliance departments, a comprehensive understanding of the specific challenges and needs they face in document management, such as document delivery, storage, and accessibility processes, was obtained. In addition, an in-depth analysis of relevant regulatory documents and industry standards, including government regulations and international security standards, was conducted to ensure that the system to be developed meets the existing requirements. The outcome of this stage is a clear and detailed requirements specification document, which will guide the next stage of Development. This document will include details on the required features, system limitations, and other specific requirements for developing a document management system for the cargo industry.

Table 1. Results of Needs Definition

Steps	Results
Identify essential document management needs	Documentation of basic document management requirements, including document delivery, storage, and accessibility
Interviews with various stakeholders in cargo companies	- In-depth understanding of the specific challenges and needs faced by stakeholders related to document management
Analysis of regulatory documents and industry standards	Analysis of relevant regulatory documents and industry standards to ensure the developed system meets the existing requirements.
Creation of requirement specification document	- Clear and detailed requirement specification document as a guide for the next stage of Development

Table 1 shows that the process of developing an Agile-based document management system for the cargo industry is well defined. The first stage, identifying basic document management needs, highlighted the importance of document delivery, storage, and accessibility in the context of the cargo industry. Interviews with various stakeholders in the

cargo company during the second stage helped to understand the challenges faced and the specific needs to be met by the system. Analysis of regulatory documents and industry standards in the third stage emphasized the importance of compliance with relevant regulations and standards in document management. Finally, creating a requirement specification document ensures that all requirements are documented and detailed to guide the next stage of Development. Thus, this requirement definition stage provides a solid foundation for developing an effective document management system that meets the needs of the cargo industry.

Planning

At the Planning stage, strategic steps were taken to ensure the smooth implementation of the project to develop an Agile-based document management system for the cargo industry. This involves the formation of a skilled project team, including software developers, business analysts, and representatives from the cargo department, as well as clearly defining the project scope, efficiently identifying and allocating the necessary resources, and creating a detailed project plan with precise work schedules, milestones, and development stages. With this careful planning, this project can run smoothly and achieve its goals according to the needs of the cargo industry.

Table 2. Planning

Stage	Results
Establishment of Project Team	- The project team consists of members with appropriate expertise, including software developers, business analysts, and representatives from the cargo department.
Determination of Project Scope	- The scope of the project was clearly defined, including the key functions to be included in the Agile document management system.
Resource Identification and Allocation	- The necessary resources, including personnel, budget, and time, are identified and allocated efficiently.
Project Plan Creation	- A detailed project plan is developed, including work schedules, milestones, and stages of Development to be undertaken.

Table 2 shows that strategic measures have been well formulated to ensure the smooth implementation of the Agile-based document management system development project for the cargo industry. Forming a project team involving members with appropriate expertise will support the diversity and expertise needed in the project. Establishing a clear project scope will help direct efforts and ensure that the main functions of the document management system to be developed are in line with user needs and expectations. Furthermore, identifying and allocating necessary resources will ensure that the project has sufficient support to carry out its tasks. Creating a detailed project plan will provide clear guidance for the project team in managing time, budget, and Development stages efficiently. By doing this careful planning, the document management system development project is expected to run according to plan and achieve the goals set.

Development

In the Development phase, the Development of the document management system was carried out in an iterative manner based on Agile methodology. The process starts with creating a minimum functional prototype, which will be evaluated and refined regularly. Regular collaboration with stakeholders and the project team will be conducted to review progress and identify necessary enhancements or additions according to user needs and expectations. Furthermore, essential document management features, such as search, storage, indexing, and access control, will be implemented in the system. Each feature developed will be thoroughly tested to ensure optimal functioning and consistency with user requirements so that the resulting system can provide significant added value to the cargo industry.

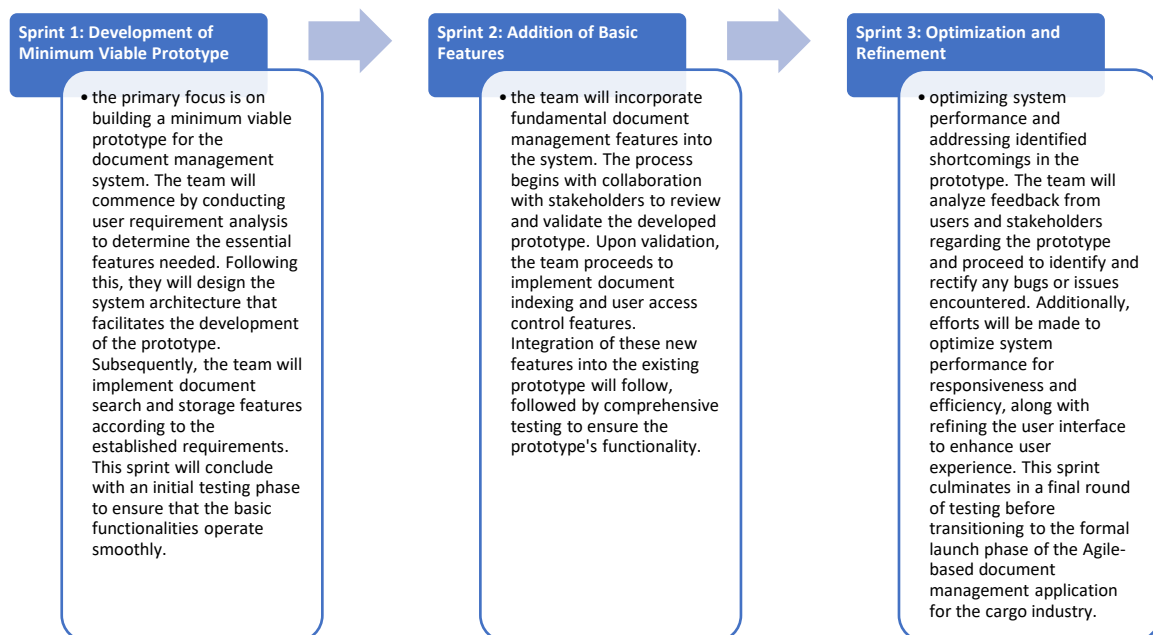


Figure 2. Sprint

In the development process shown in Figure 2 of an Agile-based document management system for the cargo industry, three critical stages are executed. The first stage involves building a minimum functional prototype to identify basic user requirements. Next, the second stage adds basic document management features, such as document search and storage, through regular stakeholder collaboration. The final stage involved optimizing and improving the system based on user and stakeholder feedback before entering the official launch stage. An analysis of these stages shows alignment with the Agile methodology in ensuring iteration, collaboration, and continuous improvement in developing an effective document management system that meets the needs of the cargo industry.

Testing

In the Testing phase, functional trials were planned and executed to test each feature and function in the document management system. In addition, load tests were conducted to measure the system's efficient performance in managing large volumes of documents. The security aspect of the system was also tested to ensure that the documents stored in the system are well protected from unauthorized access or other security threats. Finally, an acceptance test was conducted involving end users to validate that the system meets their needs and expectations well, resulting in a reliable document management system that complies with industry standards.

The test results indicate the comprehensive approach to testing the document management system before its official launch. First, the testing involved verifying the system's ability to fulfill the predefined functional needs, which is crucial to ensuring that the system meets the basic requirements. Next, an evaluation of the user interface (UI) was also included, demonstrating the focus on a good user experience. Integration testing and the system's ability to handle unusual situations or errors demonstrate efforts to ensure system interoperability and stability. An assessment of the system's ability to provide accurate and timely reports or information shows the importance of this aspect in supporting effective decision-making. Finally, evaluating system performance under different load conditions emphasizes the importance of responsiveness and reliability in natural operational environments. Thus, this table provides a comprehensive overview of the various aspects tested during the Acceptance Test, which is essential to ensure the quality and reliability of the document management system before it is rolled out to end users.

CONCLUSION

This research analyzes the implementation of an Agile-based document management system as a solution to improve efficiency and compliance in the cargo industry. The Agile approach was used to address common challenges in document management, such as inefficient manual processes, access difficulties, and risk of document loss. The development stages, including requirements definition, planning, Development, testing, and implementation, were studied in detail to ensure compliance with industry standards and meet user needs. The system could meet the expected functional, security, and performance requirements through a series of tests. Thus, this research underscores the importance of the Agile approach in improving efficiency and compliance in the cargo industry by implementing an adaptive and efficient document management system.

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