Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

Financial Management Application Development in Cargo Companies Using Agile Approach

Denny Jean Cross Sihombing
Information System Study Program, Atma Jaya Catholic University of Indonesia

Article Info
Keywords:
Financial Management,
Agile Methodology,
Cargo.

ABSTRACT
Effective financial management is crucial for cargo companies to maintain operational continuity and improve business efficiency. However, many cargo companies need help managing their finances effectively, especially related to the complexity of operations and high volume of transactions. This research aims to develop a cargo financial management application using an Agile approach to overcome these problems. The research method includes requirements definition, planning, development, and testing stages. Cargo companies' needs for financial management applications were identified through a series of stakeholder interviews and business process analysis. Next, a project plan is drawn up, a development team is determined, and potential risks are identified to direct the application development process. In the development phase, the system design of the application is conceived, core features are developed using Agile methodology, and integration with other systems in the company is performed. Testing was conducted to ensure optimal application functionality and performance. The result is a financial management application that is adaptive, responsive, and can improve the efficiency of financial management and cargo company operations. The contribution of this research is to provide an effective solution to overcome the challenges in the financial management of cargo companies and provide a foundation for the development of similar applications in the context of other cargo industries.

Corresponding Author:
Denny Jean Cross Sihombing
Atma Jaya Catholic University of Indonesia
Jakarta, Indonesia
denny.jean@atmajaya.ac.id

INTRODUCTION

A cargo company is a business entity responsible for transporting and delivering goods from one location to another. In this context, the cargo company that is the focus of the research is a large-scale land cargo company operating at the national level. The company has an extensive distribution network and provides inland freight forwarding services through various modes of transportation, such as trucks and trains. With an extensive business scale, this cargo company can handle a significant volume of freight shipments daily, including consumer, industrial, and commercial goods(Gonzalez-Calderon et al., 2022; Kim et al., 2021; Li et al., 2021; Malik et al., 2023; Njoya et al., 2023; Romero-Silva & Mujica Mota, 2022; Yang et al., 2023).

Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

The organizational structure of this cargo company includes various departments, such as operational management, logistics, finance, and customer service, which work in an integrated manner to ensure smoothness and efficiency in the freight forwarding process. Cargo companies often face complex challenges in managing their finances, especially since their operations involve many transactions and costs in shipping goods(Guo et al., 2022; Jörgensen et al., 2023; Lim et al., 2021; Malmgren et al., 2023; Narayanan & Antoniou, 2022; Soprano et al., 2023; Yıldız et al., 2023).

Currently, many cargo companies still use conventional financial management systems that tend to be manual or semi-automated, which are often prone to errors and need more efficient data integration. Common obstacles include limitations in tracking operational costs in real-time, difficulties in cash flow monitoring, and lack of visibility into overall financial performance. The impact of these problems can range from delays in strategic decision-making to the inability to optimize financial resources, which can hinder the cargo company's growth and profitability. Therefore, this research aims to develop a more efficient and integrated financial management application using an Agile approach to overcome these challenges and improve the overall performance of the cargo company(Ahn, 2023; Corrotea et al., 2024; Cudok et al., 2022; Kováciková et al., 2023; Merzlikin et al., 2022; Pobedinsky, 2022; Wang et al., 2023).

The agile approach has become the preferred choice in application development due to its flexibility, which enables rapid adaptation to changing needs and dynamic business environments. The basic principles of the Agile approach include strong collaboration between development teams and stakeholders, prioritization of incremental delivery of working products, rapid iteration, adaptation to change, and focus on people and interactions. The key benefits of using Agile approaches in application development include the ability to produce higher quality products quickly, improve user satisfaction through continuous iterative delivery, and increase visibility and control over the project(Alami et al., 2022; Almeida et al., 2022; Batliner et al., 2022; Estrada-Esponda et al., 2024; Humpert et al., 2022; Meiliana et al., 2023; Michalides et al., 2023; Mishra & Alzoubi, 2023). For cargo companies, Agile approaches are well suited due to the industry's dynamic nature, which often experiences changes in business needs and technology. Using an Agile approach, cargo companies can quickly adapt their financial management applications according to market demands and improve operational efficiency.

This research is essential and relevant in developing financial management applications for cargo companies. By introducing an Agile approach in the development of such applications, this research is expected to significantly contribute to improving efficiency and effectiveness in managing the finances of cargo companies. Considering the specific needs of the cargo industry and its associated dynamics, the application resulting from this research will be designed to provide features that suit their business needs, such as operational cost tracking, inventory management, and accurate financial reporting. The main benefits for cargo companies are increased control and visibility over their financial aspects, the ability to make better strategic decisions based on integrated data, and improved over-

Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

all operational efficiency, which will positively impact the company's growth and profitability.

METHODS

Developing a financial management application for a cargo company began with a requirements definition involving stakeholder interviews and business process analysis, followed by project planning that included goal setting, scope, and risk identification. The development phase involves designing the application system and developing core features using an Agile approach. In contrast, the testing phase includes comprehensive test scenarios to verify the performance and functionality of the application. This process is designed to produce an efficient and integrated financial management application. It is expected to provide significant benefits to cargo companies in improving their financial management and overall operational efficiency, as shown in Figure 1.

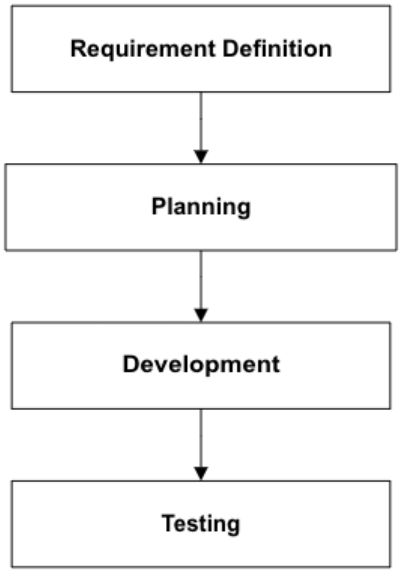

Figure 1. Research Stages

Definition of need

The first stage in this research was needs definition, which began with interviews with relevant parties from the cargo company. Through this process, we sought to deeply understand the needs and expectations of the financial management application to be developed. In addition, we conducted a comprehensive analysis of the cargo company's business processes to identify weak points and opportunities for improvement that can be accommodated through application development. Historical data on the company's financial transactions was also collected and analyzed to understand the existing spending and revenue patterns better.

Planning

The planning stage entails drawing up a detailed project plan. This includes determining the project objectives, defining the scope, development schedule, and proper resource allocation. The development team is also carefully formed, considering the expertise and skills required to handle the various aspects of the application. In addition, potential

Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

risks associated with the application development are identified, and suitable mitigation strategies are devised to address them.

Development

In the development stage, the design of the application system is organized based on the previously defined requirements. This includes designing the user interface, database structure, and application architecture. The application's core features were developed using an Agile approach, dividing the work into clearly defined iterations or sprints. Integration of the application system with other systems in the cargo company was also carefully done to ensure optimal compatibility and interconnectedness.

Testing

The testing phase is conducted to validate the performance and functionality of the application that has been developed. Comprehensive test scenarios are compiled to cover a wide range of usage situations, both under normal and extreme conditions. Functional testing is conducted to verify that each application feature operates as expected. In addition, performance testing was also conducted to evaluate the responsiveness and stability of the application when handling high workloads.

RESULTS AND DISCUSSION

Definition of need

The results of the requirements definition stage included several essential steps. First, through a series of interviews with the cargo company's internal and external stakeholders, we gained a deep understanding of the needs and expectations related to the financial management application to be developed. Next, through a thorough analysis of the cargo company's business processes, we identified weak points and opportunities for improvement that could be accommodated through the application development. Finally, by collecting historical data on the cargo company's financial transactions, we could better understand the existing pattern of expenses and receipts, helping design features that would suit their business needs. These steps helped formulate precise requirements and guided the subsequent development of the financial management app.

Table 1. Results of Needs Definition

Stage	Results
Needs Definition	- Interviews with internal and external stakeholders of the cargo company to understand the needs and expectations related to the financial management application. The results of the interviews included an in-depth understanding of the users' needs for the application, such as the need for operational cost tracking, inventory management, etc.
Analysis	- An in-depth analysis of the cargo company's business processes has identified weak points and opportunities to be improved through application development. This step provided insight into areas where the app could improve effi-

Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

	ciency and productivity, such as shipment tracking and stock management.
Data Collection	- Collecting historical data on the cargo company's financial transactions enabled a better understanding of the existing patterns of expenses and receipts. These data will form the basis for designing app features that suit the company's business needs, such as financial report generation and cost analysis.

Based on Table 1, this process provides a comprehensive understanding of the needs and challenges faced by cargo companies in their financial management. Through stakeholder interviews, specific needs for financial management applications were identified, including the need for operational cost tracking and inventory management. Business process analysis also revealed weak points in the company's operational processes, which could be improved through application development. In addition, the collection of historical data on financial transactions provided a clearer view of the company's expenditure and revenue patterns, which formed the basis for designing appropriate application features according to business needs. This analysis provides a strong foundation for developing a practical financial management application that suits the needs of cargo companies.

Planning

The results of the planning stage, as shown in Figure 2, indicate the seriousness and strong readiness to implement the project of developing financial management applications for cargo companies. Creating a detailed project plan reflects a deep understanding of the objectives and scope of the project, as well as the ability to manage schedules and resources efficiently. Establishing an appropriate development team with the necessary skills and expertise guarantees that competent individuals will handle every aspect of the application. In addition, identifying potential risks and devising mitigation strategies demonstrate preparedness to deal with challenges that may arise during application development. Overall, the results of this planning phase demonstrate a strong foundation for the project's success and mitigate the risks associated with the app's development.

Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

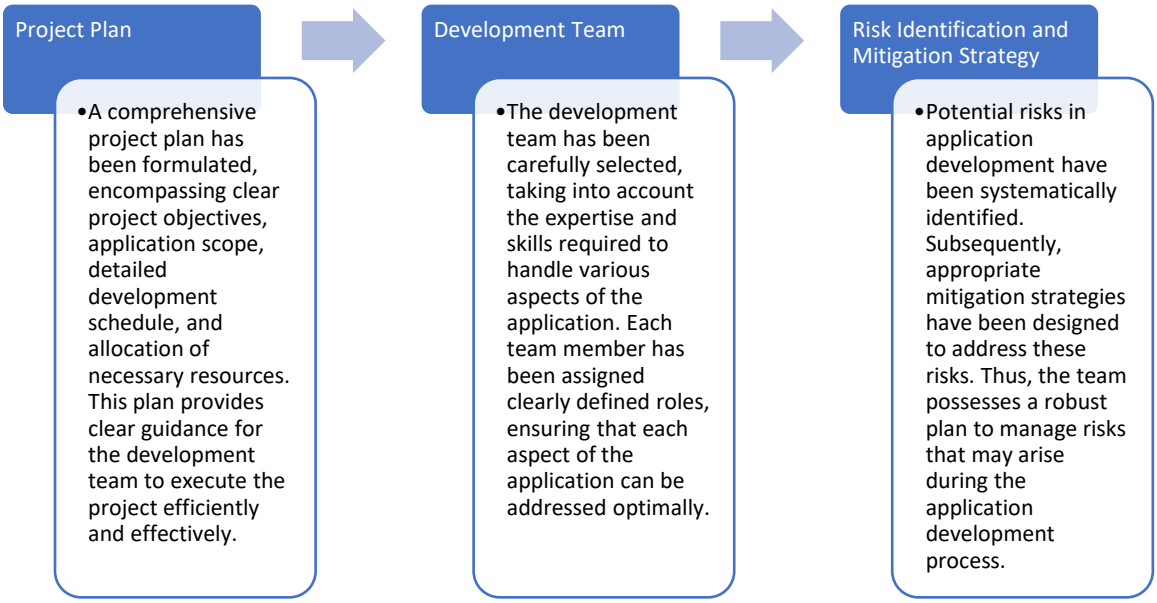

Figure 2. Project Plan

Development

The results of the financial management application development stage for cargo companies have proven to be significant. First, a comprehensive system design of the application has been successfully created, describing in detail the user interface design, database structure, and application architecture by the previously defined requirements. Secondly, the application's core features were developed using the Agile methodology, which allows the division of work into clearly defined sprints. This approach ensures continuous iteration and the ability to adapt to changing requirements that may arise during the development process.

Finally, the integration of the application system with other systems in the cargo company, such as the inventory management system or shipment tracking system, has been successfully carried out. This integration ensures operational alignment and smooth data exchange between the various systems, improving the overall efficiency and performance of the application. Thus, this stage of development has provided a solid foundation for the success of the financial management application and made a significant contribution to the operational improvement of the cargo company.

Table 3. Development

Sprint	Objective	Activities	Output
1	Formulate the conceptual design of the app	- Sketching the initial user interface. - Drafted the database structure.	- Conceptual design document of the application. - Sketch of the user interface.

Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

2	Detailing the app design	- Develop a more detailed user interface design. - Create a more detailed database schema.	- A more complete user interface design. - Detailed database schema.
3	Develop core features	- Implementation of core features such as operational cost management and basic financial reporting.	- Implemented core features.
4	Integrating the app with the system	- Customize integration with inventory management systems. - Sketching the initial user interface. - Drafted the database structure. - Develop a more detailed user interface design. - Create a more detailed database schema. - Implementation of core features such as operational cost management and basic financial reporting. - Customize integration with inventory management systems. - Integrate the application with the shipment tracking system.	- Application integrated with other systems in the company.

Table 3 shows the stages required to achieve the development goals in stages. Each sprint has its focus and produces outputs that can be evaluated separately. Sprints 1 and 2 focus on designing the application, from conceptualization to detailed design. This is important because it provides a solid foundation for further development. Sprint 3 focuses on developing the application's core features, ensuring that critical functions are well-implemented. Sprint 4 focuses on integrating the application with other systems in the company, which is crucial to ensure the application can interact with the existing IT infrastructure. With this approach, development is iterative, allowing the team to adjust and improve the application over time. It also allows for regular evaluation of progress, ensuring that the application develops according to the company's expectations and needs. This table provides clear guidelines for managing the application development process systematically and effectively.

Testing

The application testing phase showed that the testing process was thorough, according to the application's various functional and performance aspects. Creating test scenarios covering a wide range of usage situations provided a comprehensive overview of the application's ability to handle various operational conditions. Functional testing for each feature ensures the functions run correctly and according to user expectations. Meanwhile, perfor-

Jurnal Ekonomi
Volume 13 , Number 01, 2024, DOI 10.54209/ekonomi.v13i01
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

mance testing is essential to measure the responsiveness and stability of the application under high workload pressure, ensuring a smooth user experience even under high traffic conditions. Thus, this comprehensive testing process supports the development of high-quality and reliable applications in day-to-day operations.

CONCLUSION

Developing a financial management application for a cargo company with an agile approach has successfully provided an effective solution for overcoming the challenges faced in financial management. Through the phases of requirements definition, planning, development, and testing, a deep understanding of the needs of the cargo company, as well as the design and implementation of the application, was obtained. The Agile approach enables the development of applications that are adaptive and responsive to changing needs, while a comprehensive testing process ensures optimal application quality and performance. Thus, the resulting application is expected to provide significant benefits to cargo companies in improving the efficiency of financial management and overall operations. In addition, this research also provides a strong foundation for developing similar applications in other contexts of the cargo industry. It encourages using agile approaches in software development in various industry sectors.

REFERENCE

Ahn, W. C. (2023). Study on improvement in logistics industry in Gangwon province: Focusing on Yangyang International Airport. *Asian Journal of Shipping and Logistics*, *39*(1), 23–29. https://doi.org/10.1016/j.ajsl.2022.11.001

Alami, A., Krancher, O., & Paasivaara, M. (2022). The journey to technical excellence in agile software development. *Information and Software Technology*, *150*. https://doi.org/10.1016/j.infsof.2022.106959

Almeida, F., Simões, J., & Lopes, S. (2022). Exploring the Benefits of Combining DevOps and Agile. *Future Internet*, *14*(2). https://doi.org/10.3390/fi14020063

Batliner, M., Boës, S., Heck, J., & Meboldt, M. (2022). Linking Testing Activities with Success in Agile Development of Physical Products. *Procedia CIRP*, *109*, 146–154. https://doi.org/10.1016/j.procir.2022.05.228

Corrotea, H., Portales, H., Amigo, L., Gatica, G., Troncoso-Palacio, A., Mondragón, D., & Ramos, M. (2024). Maintenance Process Analysis in a Port Cargo Company through Discrete Event Simulation. *Procedia Computer Science*, *231*, 415–420. https://doi.org/10.1016/j.procs.2023.12.227

Cudok, A., Neugebauer, L., & Vietor, T. (2022). Increasing Acceptance for Refurbished Products at the Example of E-Cargo Bikes. *Procedia CIRP*, *105*, 571–576. https://doi.org/10.1016/j.procir.2022.02.095

Estrada-Esponda, R. D., López-Benítez, M., Matturro, G., & Osorio-Gómez, J. C. (2024). Selection of software agile practices using Analytic hierarchy process. *Heliyon*, *10*(1). https://doi.org/10.1016/j.heliyon.2023.e22948

Gonzalez-Calderon, C. A., Posada-Henao, J. J., Granada-Muñoz, C. A., Moreno-Palacio, D. P., & Arcila-Mena, G. (2022). Cargo bicycles as an alternative to make sustainable last-mile deliveries in Medellin, Colombia. *Case Studies on Transport Policy*, *10*(2), 1172–1187. https://doi.org/10.1016/j.cstp.2022.04.006

Guo, Y., Hu, G., Xia, Y., Li, H. Y., Yuan, J., Zhang, J., Chen, Y., Guo, H., Yang, Y., Wang, Y., & Deng, Z. (2022). Eliminating the original cargos of glioblastoma cell-derived small extracellular vesicles for efficient drug delivery to glioblastoma with improved biosafety. *Bioactive Materials*, *16*, 204–217. https://doi.org/10.1016/j.bioactmat.2022.02.013

Humpert, L., Röhm, B., Anacker, H., Dumitrescu, R., & Anderl, R. (2022). Method for direct end customer integration into the agile product development. *Procedia CIRP*, *109*, 215–220. https://doi.org/10.1016/j.procir.2022.05.239

Jörgensen, A. M., Wibel, R., Veider, F., Hoyer, B., Chamieh, J., Cottet, H., & Bernkop-Schnürch, A. (2023). Self-emulsifying drug delivery systems (SEDDS): How organic solvent release governs the fate of their cargo. *International Journal of Pharmaceutics*, *647*. https://doi.org/10.1016/j.ijpharm.2023.123534

Kim, S., Sohn, W., Lim, D., & Lee, J. (2021). A multi-stage data mining approach for liquid bulk cargo volume analysis based on bill of lading data. *Expert Systems with Applications*, *183*. https://doi.org/10.1016/j.eswa.2021.115304

Kováciková, K., Materna, M., Sedlácková, A. N., & Kováciková, M. (2023). The impact of the pandemic on the business models of air cargo carriers. *Transportation Research Procedia*, *74*, 267–274. https://doi.org/10.1016/j.trpro.2023.11.144

Li, W., Pundt, R., & Miller-Hooks, E. (2021). An updatable and comprehensive global cargo maritime network and strategic seaborne cargo routing model for global containerized and bulk vessel flow estimation. *Maritime Transport Research*, *2*. https://doi.org/10.1016/j.martra.2021.100038

Lim, S., Kim, S. J., Park, Y. J., & Kwon, N. (2021). A deep learning-based time series model with missing value handling techniques to predict various types of liquid cargo traffic. *Expert Systems with Applications*, *184*. https://doi.org/10.1016/j.eswa.2021.115532

Malik, F. A., Egan, R., Dowling, C. M., & Caulfield, B. (2023). Factors influencing e-cargo bike mode choice for small businesses. *Renewable and Sustainable Energy Reviews*, *178*. https://doi.org/10.1016/j.rser.2023.113253

Malmgren, E., Brynolf, S., Styhre, L., & van der Holst, J. (2023). Navigating unchartered waters: Overcoming barriers to low-emission fuels in Swedish maritime cargo transport. *Energy Research and Social Science*, *106*. https://doi.org/10.1016/j.erss.2023.103321

Meiliana, Daniella, G., Wijaya, N., Putra, N. G. E., & Efata, R. (2023). Agile Software Development Effort Estimation based on Product Backlog Items. *Procedia Computer Science*, *227*, 186–193. https://doi.org/10.1016/j.procs.2023.10.516

Merzlikin, I., Zueva, A., Kievskaya, S., Shkoropat, E., & Popov, K. (2022). The market of air transportation and cargo transportation in the investment strategy of transport enterprises. *Transportation Research Procedia*, *63*, 1420–1430. https://doi.org/10.1016/j.trpro.2022.06.153

Michalides, M., Bursac, N., Nicklas, S. J., Weiss, S., & Paetzold, K. (2023). Analyzing current Challenges on Scaled Agile Development of Physical Products. *Procedia CIRP*, *119*, 1188–1197. https://doi.org/10.1016/j.procir.2023.02.188

Mishra, A., & Alzoubi, Y. I. (2023). Structured software development versus agile software development: a comparative analysis. *International Journal of System Assurance Engineering and Management*. https://doi.org/10.1007/s13198-023-01958-5

Narayanan, S., & Antoniou, C. (2022). Electric cargo cycles - A comprehensive review. *Transport Policy*, *116*, 278–303. https://doi.org/10.1016/j.tranpol.2021.12.011

Njoya, E. T., Forsyth, P., Niemeier, H.-M., & Nikitas, A. (2023). Examining the impact of air cargo growth on poor Vietnamese rural and urban households. *Transport Economics and Management*, *1*, 112–125. https://doi.org/10.1016/j.team.2023.08.001

Pobedinsky, A. (2022). Assessment of the influence of air temperature and cargo weight on fuel consumption and emissions of harmful substances with vehicle exhaust gases. *Transportation Research Procedia*, *63*, 2687–2694. https://doi.org/10.1016/j.trpro.2022.06.310

Romero-Silva, R., & Mujica Mota, M. (2022). Trade-offs in the landside operations of air cargo hubs: Horizontal cooperation and shipment consolidation policies considering capacitated nodes. *Journal of Air Transport Management*, *103*. https://doi.org/10.1016/j.jairtraman.2022.102253

Soprano, E., Migliavacca, M., López-Ferreiro, M., Pelaz, B., Polo, E., & del Pino, P. (2023). Fusogenic Cell-Derived nanocarriers for cytosolic delivery of cargo inside living cells. *Journal of Colloid and Interface Science*, *648*, 488–496. https://doi.org/10.1016/j.jcis.2023.06.015

Wang, W., Sun, W., Awan, U., A. Nassani, A., H. Binsaeed, R., & Zaman, K. (2023). Green investing in China's air cargo industry: Opportunities and challenges for sustainable transportation. *Heliyon*, *9*(8). https://doi.org/10.1016/j.heliyon.2023.e19013

Yang, H., Landes, H., & Chow, J. Y. J. (2023). A large-scale analytical residential parcel delivery model evaluating greenhouse gas emissions, COVID-19 impact, and cargo bikes. *International Journal of Transportation Science and Technology*. https://doi.org/10.1016/j.ijtst.2023.08.002

Yıldız, B., Savelsbergh, M., & Dogru, A. K. (2023). Transshipment network design for express air cargo operations in China. *EURO Journal on Transportation and Logistics*, *12*. https://doi.org/10.1016/j.ejtl.2023.100120