

Ukrainian State University of Railway Transport
Department of Management, Public Administration and HR Technologies

MECHANISMS FOR MANAGING COSTS OF ENTERPRISE LOGISTICS AND SUPPLY PROCESSES

Explanatory Report and Analytical Calculations
to the Master's Qualification Thesis
under the educational program "Sustainable Logistics and Supply Chain Management"
specialty 073 "Management"

KPM 073. 12111570 П3

Prepared by the Master's Degree Student
(second-cycle higher education)
(self-performed work in full compliance
with the principles of academic integrity)
Group 210-SL-D24
Lidia DROZDOVA

Supervisor: Professor, Doctor of
Economics
Olena DYKAN

Reviewer: Professor, Doctor of Economics
Myroslava KORIN

2025

ABSTRACT

This qualification thesis comprises 19 presentation slides and 78 A4 pages of an explanatory report, including 2 figures, 8 tables, and 75 referenced sources.

Keywords: COST MANAGEMENT, LOGISTICS PROCESSES, LOGISTICS COSTS, SUPPLY ACTIVITIES, 3PL/4PL MODELS, WARTIME ECONOMY.

The object of the research is the logistics activity of an enterprise operating under wartime economic conditions.

The purpose of this qualification thesis is to substantiate an analytical approach to enterprise logistics and supply-related cost management under wartime conditions by identifying the limitations of existing cost management frameworks and developing an adapted diagnostic model for assessing and managing logistics costs in a resource-constrained environment.

The study systematises the theoretical and methodological foundations of logistics cost management.

Based on data from LLC "Daktyl" for the period 2021–2024, a comprehensive analysis of operational activities, service structure, and resource utilisation efficiency was conducted.

Adaptive mechanisms for improving the enterprise's logistics and supply processes under wartime instability based on 3PL/4PL approaches are substantiated. These mechanisms are aimed at enhancing the transparency of logistics cost formation, optimising transport and warehousing operations, and strengthening the coordination of material and information flows within supply chains. The results may be applied by enterprises in the transport and logistics sector to increase logistics resilience and improve cost management efficiency under wartime and post-war conditions.

АНОТАЦІЯ

Дана кваліфікаційна робота включає в себе 19 слайдів презентації, 78 аркушів пояснівальної записки формату А4, що містять 2 рисунки, 8 таблиць, 75 використаних літературних джерел.

Ключові слова: УПРАВЛІННЯ ВИТРАТАМИ, ЛОГІСТИЧНІ ПРОЦЕСИ, ЛОГІСТИЧНІ ВИТРАТИ, ПОСТАЧАЛЬНИЦЬКА ДІЯЛЬНІСТЬ, 3PL/4PL-МОДЕЛІ, ВОЄННА ЕКОНОМІКА.

Об'єктом дослідження є логістична діяльність підприємства в умовах сучасних викликів воєнної економіки.

Метою кваліфікаційної роботи є обґрунтування аналітичного підходу до управління логістично-постачальницькими витратами підприємства в умовах воєнного стану шляхом виявлення обмежень існуючих підходів до управління витратами та розроблення адаптованої діагностичної моделі оцінювання й управління витратами в умовах обмежених ресурсів.

У роботі систематизовано теоретико-методологічні засади управління логістичними витратами.

На основі даних ТОВ «Дактіль» за 2021 - 2024 рр. проведено комплексний аналіз операційної діяльності, структури послуг, ефективності використання ресурсів.

Обґрунтовано адаптивні механізми вдосконалення логістичних і постачальницьких процесів підприємства в умовах воєнної нестабільності на засадах 3PL/4PL, спрямовані на підвищення прозорості формування логістичних витрат, оптимізацію транспортно-складських операцій та посилення координації потоків у ланцюгах постачання. Результати можуть бути використані підприємствами транспортно-логістичного сектору для підвищення логістичної стійкості й ефективності управління витратами у воєнних і післявоєнних умовах.

Ukrainian State University of Railway Transport

Faculty of Economics

Department of Management, Public Administration and HR Technologies

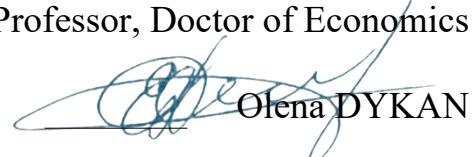
Higher Education Level: Master

Educational Programme: Sustainable Logistics and Supply Chain Management

Specialty: 073 "Management"

APPROVED

Head of Department
Professor, Doctor of Economics



Olena DYKAN

September 09, 2025.

ASSIGNMENT FOR THE MASTER'S QUALIFICATION WORK

Lidia DROZDOVA

1 Topic «Mechanisms for Managing Costs of Enterprise Logistics and Supply Processes»

supervisor Olena Dykan, Doctor of Economics, Professor

approved by the Order of the Faculty of Economics dated February 07, 2025 No. 58/25

2 The deadline for submission of completed work by a higher education applicant is December 12, 2025

3 Initial data Explanatory notes and production-economic reports of LLC “Daktyl” for 2020 - 2024, as well as regulatory acts, standards, methodological materials and scientific sources on logistics management and cost management.

4 Content of the calculation and explanatory note (list of issues to be developed)
Core Theories of Supply Chain Management and Logistics Integration. Structure and Typology of Logistics and Supply Chain Costs. Key Factors and Determinants of Supply Chain Performance. Analytical Approaches and Models for Optimising Logistics Costs. Methodological Framework and Research Design. General Characteristics and Strategic Positioning of LLC “Daktyl”. Analysis of Operational Performance and Service Portfolio. Efficiency of Resource Utilisation: Fixed Assets, Working Capital, and Human Resources. Integrated Analysis of Cost of Goods Sold, Logistics Expenditures, and the Enterprise’s Financial Performance. Analytical Justification for the Transformation of Logistics Cost Management under Wartime Conditions. Analytical Framework for Managing Logistics and Supply Chain Costs within 3PL/4PL Systems. Scenario-Based Adaptation of Logistics and Supply Processes at LLC “Daktyl” within a 3PL/4PL Framework. Assessment of the Strategic Stability of Logistics Costs of the Enterprise During Wartime.

5 List of graphic material

1 Theoretical and Methodological Foundations of Cost Management in Logistics and Supply Chains- six slides. 2 Empirical Analysis of Logistics Operations, Resource Utilisation, and Financial Resilience of LLC “Daktyl” in the Context of a Wartime Economy - five slides. 3 Analytical Framework and Adaptive Mechanisms for Managing Logistics and Supply Chain Costs under Wartime Conditions - eight slides.

6 Individual Section Consultants

Section	Surname, initials, title and academic degree Consultant	Signature, date	
		The task was issued by	task Took

7 Assignment Date September 09, 2025

CALENDAR PLAN

Stage name	Deadline for the implementation of the stages of work	Note
1 Theoretical and Methodological Foundations of Cost Management in Logistics and Supply Chains	10.10.2025	
2 Empirical Analysis of Logistics Operations, Resource Utilisation, and Financial Resilience of LLC “Daktyl” in the Context of a Wartime Economy	05.11.2025	
3 Analytical Framework and Adaptive Mechanisms for Managing Logistics and Supply Chain Costs under Wartime Conditions	08.12.2025	
Graphic part	10.12.2025	

Higher education applicant  Lidia DROZDOVA

Supervisor  Olena DYKAN

Contents

Introduction	7
1 Theoretical and Methodological Foundations of Cost Management in Logistics and Supply Chains	11
1.1 Core Theories of Supply Chain Management and Logistics Integration	11
1.2 Structure and Typology of Logistics and Supply Chain Costs	15
1.3 Key Factors and Determinants of Supply Chain Performance	17
1.4 Analytical Approaches and Models for Optimising Logistics Costs	18
1.5 Methodological Framework and Research Design	20
Conclusions to Chapter 1	24
2 Empirical Analysis of Logistics Operations, Resource Utilisation, and Financial Resilience of LLC “Daktyl” in the Context of a Wartime Economy	26
2.1 General Characteristics and Strategic Positioning of LLC “Daktyl”	26
2.2 Analysis of Operational Performance and Service Portfolio	28
2.3 Efficiency of Resource Utilisation: Fixed Assets, Working Capital, and Human Resources	30
2.4 Integrated Analysis of Cost of Goods Sold, Logistics Expenditures, and the Enterprise’s Financial Performance	34
Conclusions to Chapter 2	38
3 Analytical Framework and Adaptive Mechanisms for Managing Logistics and Supply Chain Costs under Wartime Conditions	41
3.1 Analytical Justification for the Transformation of Logistics Cost Management under Wartime Conditions	41
3.2 Analytical Framework for Managing Logistics and Supply Chain Costs within 3PL/4PL Systems	46

					KPM 073. 12111570 ПІ3			
Rev.	Sheet	Document No.	Signature	Date				
Prepared by	Drozdova L.M.							
Reviewed by	Dykan O.V.							
Standards Control	Krykhtina Y.O.							
Approved by	Dykan O.V.							
Mechanisms for Managing Costs of Enterprise Logistics and Supply Processes					Ref..	Sheet	Sheets	
					5	78		
					UkrSURT			

3.3 Scenario-Based Adaptation of Logistics and Supply Processes at LLC “Daktyl” within a 3PL/4PL Framework	50
3.4 Assessment of the Strategic Stability of Logistics Costs of the Enterprise During Wartime	54
Conclusions to Chapter 3	59
Conclusions	62
References	65
Appendix	71

References

- 1 Christopher M. Logistics & Supply Chain Management. Harlow : Pearson Education Limited, 2016.
- 2 Mentzer J. T., DeWitt W., Keebler J. S. et al. Defining supply chain management. *Journal of Business Logistics*. 2001. Vol. 22, No. 2. P. 1–25.
- 3 Ivanov D., Tang C. S., Dolgui A., Sokolov B. Impact of risk, resilience, and sustainability on supply chain redesign. *International Journal of Production Economics*. 2023. Vol. 255. P. 108–148.
- 4 Stadtler H. Supply chain management: An overview. *Supply Chain Management and Advanced Planning*. Berlin : Springer, 2015.
- 5 Marasco A. Third-party logistics: A literature review. *International Journal of Production Economics*. 2008. Vol. 113, No. 1. P. 127–147.
- 6 Sople V. V. Logistics and Supply Chain Management. New Delhi : Pearson India, 2021.
- 7 Williamson O. E. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York : The Free Press, 1985.
- 8 Rushton A., Croucher P., Baker P. *The Handbook of Logistics and Distribution Management*. London : Kogan Page, 2022.
- 9 Cokins G. *Cost Management: A Strategic Emphasis*. New York : McGraw-Hill Education, 2017.
- 10 Grant D. B., Trautrimas A., Wong C. Y. *Sustainable Logistics and Supply Chain Management*. London : Kogan Page, 2017.
- 11 Kaplan R., Cooper R. *Cost & Effect: Using Integrated Cost Systems to Drive Profitability and Performance*. Boston : Harvard Business School Press, 1998.
- 12 Heskett J., Ivie R., Glaskowsky N. *Business Logistics: Management of Physical Supply and Distribution*. New York : Ronald Press, 1964.
- 13 Ivanov D. *Global Supply Chain Resilience: Theory and Practice*. Cham : Springer, 2023.
- 14 Choi T.-M., Cheng T. C. E. *Supply Chain Risk Management: Empirical*

Studies and Research Issues. Cham : Springer, 2021.

15 Slack N., Brandon-Jones A., Burgess N. Operations Management. Harlow : Pearson, 2022.

16 Van den Berg J., Zijm H. Models for warehouse management: Classification and examples. European Journal of Operational Research. 1999. Vol. 122, No. 2. P. 151–169.

17 Bowersox D. J., Closs D. J., Cooper M. B. Supply Chain Logistics Management. New York : McGraw-Hill Education, 2019.

18 Hofmann E., Rüsch M. Industry 4.0 and logistics: Current status and future prospects. Computers in Industry. 2017. Vol. 89. P. 23–34.

19 Kaplan R. S., Cooper R. Measure costs right: Make the right decisions. Harvard Business Review. 1988.

20 Drury C. Management and Cost Accounting. Andover : Cengage Learning, 2018.

21 Cokins G. Activity-Based Costing: Making It Work for Small and Mid-Sized Companies. Hoboken : Wiley, 2013.

22 Kaplan R. S., Anderson S. R. Time-driven activity-based costing. Harvard Business Review. 2004. Vol. 82, No. 11. P. 131–138.

23 Supply Chain Council. SCOR Digital Standard. Version 13.0. Chicago : Supply Chain Council, 2023.

24 Thürer M., Stevenson M., Protzman C. SCOR model: Applications, developments, and future directions. International Journal of Production Research. 2022. Vol. 60, No. 4. P. 1093–1110.

25 OECD. OECD Supply Chain Resilience Review: Navigating Risks. Paris : OECD Publishing, 2025. DOI: 10.1787/94e3a8ea-en.

26 Harrington L. Logistics cost management in disruptive environments. MIT Supply Chain Review. 2022.

27 Lambert D. Supply Chain Management: Processes, Partnerships, Performance. Scottsdale : Supply Chain Management Institute, 2023.

28 Williamson O. The Mechanisms of Governance. Oxford : Oxford

University Press, 1996.

- 29 Cooper R., Kaplan R. S. Activity-based systems: Measuring the costs of resource usage. *Accounting Horizons*. 1991.
- 30 Chopra S., Meindl P. *Supply Chain Management: Strategy, Planning, and Operation*. Harlow : Pearson, 2021.
- 31 OECD. *Logistics and transport under wartime conditions: Analytical overview for Eastern Europe*. Paris : OECD, 2023.
- 32 Shepitko V. M. Cost management in logistics systems. *Economy and State*. 2021. No. 5. P. 44–48.
- 33 Bieliaiev V. Ye. Digitalisation of supply chains: Trends and development prospects. *Efficient Economy*. 2022. No. 3. P. 15–22.
- 34 UNCTAD. *Digital Transport and Logistics: Global Trends and Implications*. Geneva : UNCTAD, 2022.
- 35 Mazaraki A. *Logistics systems and enterprise cost management*. Kyiv : KNEU, 2020.
- 36 European Logistics Association. *Cost Efficiency Standards for European Logistics*. Brussels : ELA, 2023.
- 37 Deloitte. *Global Logistics Report: Cost Trends and Risk Outlook*. London : Deloitte, 2022.
- 38 Schwab K. *The Fourth Industrial Revolution*. Geneva : World Economic Forum, 2021.
- 39 Ukrainian Logistics Alliance. *Analytical review of logistics costs during wartime*. Kyiv, 2024.
- 40 Ministry of Infrastructure of Ukraine. *Annual Transport and Logistics Report*. Kyiv, 2024.
- 41 Rodrigue J.-P. *The Geography of Transport Systems*. London : Routledge, 2020.
- 42 DHL. *Global Connectedness Report*. Bonn : DHL Research & Innovation Center, 2023.
- 43 McKinnon A. *Decarbonizing Logistics: Distributing Goods in a Low*

Carbon World. London : Kogan Page, 2018.

44 World Bank. Logistics Performance Index Report. Washington, DC, 2023.

45 IBM. Digital Reinvention in Supply Chains: Global Report. Armonk : IBM, 2022.

46 Accenture. Supply Chain Operations under Disruption: Global Insights. Dublin : Accenture, 2023.

47 Kache F., Seuring S. Challenges and opportunities of digital information at the intersection of big data analytics and supply chain management. International Journal of Operations & Production Management. 2017. Vol. 37, No. 1.

48 UN ESCAP. Transport and Logistics in Crisis Conditions: Regional Outlook. Bangkok : UN ESCAP, 2023.

49 Crainic T. G., Laporte G. Fleet Management and Logistics. Cham : Springer, 2016.

50 Ivanov D. Viable Supply Chain Design: Resilience and Sustainability. Cham : Springer, 2022.

51 PwC. Logistics Sector Outlook in Eastern Europe. London : PwC, 2023.

52 European Commission. Transport in Time of War: Analytical Report. Brussels, 2023.

53 Grant D. B. Global Logistics. London : Kogan Page, 2021.

54 CILT UK. Logistics & Supply Chain Trends: Annual Review. London : CILT, 2022.

55 Ukrainian Chamber of Commerce. Logistics Risks and Adaptation Strategies Report. Kyiv, 2024.

56 Vasyltsiv N. Transformation of logistics under wartime conditions. Economy and Society. 2023. No. 55. DOI: 10.32782/2524-0072/2023-55-78.

57 Hurzhii N., Havran V., Sapotnitska N. Digital technologies and logistics. Economy and Society. 2022. No. 55.

58 Dykan O. V., Krykhtina Yu. O. Methodical guidelines for preparing qualification theses for master's degree students in specialty 073 "Management". Kharkiv : Ukrainian State University of Railway Transport, 2021. 35 p.

59 Economic Pravda. How logistics adapted to the war. URL: <https://www.epravda.com.ua/columns/2023/07/24/702529/> (accessed: 20.10.2025).

60 Zaverbnyi A., Dvulit Z., Vuiek H. Logistics chains under wartime conditions. Economy and Society. 2022. No. 43. DOI: 10.32782/2524-0072/2022-43-54.

61 Zakernychna K. O., Koleshnia Ya. O. Digitalisation in warehouse logistics. Business, Innovations, Management. 2021. P. 260–261.

62 Kantsedal N., Leha O., Morozov Ye. Digitalisation of logistics. Economic Space. 2025. No. 199. P. 45–51. DOI: 10.30838/EP.199.45-51.

63 Kozar L. M. et al. Student academic reporting. General requirements for structure and formatting. Kharkiv : Ukrainian State University of Railway Transport, 2014. 46 p.

64 Logistics during the war in Ukraine. URL: <https://glc.in.ua/uk/logistika-v-voemya-voyny-v-ukraine/> (accessed: 20.10.2025).

65 Ovcharenko O. Logistics during wartime: How to reconfigure logistics. URL: https://zaxid.net/statti_tag50974 (accessed: 16.10.2025).

66 Polianska A. S., Martynets V. B., Kaban O. V. Optimisation of enterprise supply chains. Actual Problems of Regional Economy Development. 2022. Vol. 18, No. 2. P. 112–127.

67 Potapova N. A. Information flow management under digitalisation. Digital Economy as a Factor of Innovative Development of Society. 2020. P. 66–67.

68 Sorokivska N. V., Dmytriv D. V. Digital twins in logistics activity. Proceedings of the 5th International Scientific and Practical Conference. Ternopil, 2024.

69 Suvorova I. M., Hlushchenko S. D. Transformation of logistics under the influence of digitalisation. Black Sea Economic Studies. 2024. No. 92. P. 163–168. DOI: 10.32782/bses.92-24.

70 Fomichenko I. Smart logistics. Economic Bulletin of Donbas. 2020. No. 1(59). P. 63–71.

71 Tsikh H., Sukhoversha V. Logistics and digital transformation. Galician Economic Bulletin. 2024. No. 6(91). P. 44.

72 Dykan O. V., Kudriavtseva O. V. Organization of the cargo handling logistics process. *Economics of the Transport Complex*. 2023. No. 41. DOI: 10.30977/ETK.2225-2304.2023.41.120.

73 Dykan O. V., Drozdova L. M. Cross-sectoral solutions for reducing logistics costs under military threats. *Logistics and Transport Security: Problems and Prospects for Development in the Context of Analyzing Contemporary Challenges and Threats. Proceedings of the 3rd International Scientific and Practical Conference*. 2025. P. 97–100.

74 Cabinet of Ministers of Ukraine. Resolution No. 695 “On Approval of the State Strategy for Regional Development for 2021–2027”. Kyiv, 2020.

75 Cabinet of Ministers of Ukraine. *National Transport Strategy of Ukraine until 2030*. Kyiv, 2018.