

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

**DESIGNING A MULTILEVEL SYSTEM FOR MANAGING THE
EFFICIENCY OF FINANCIAL FLOWS IN THE SUPPLY CHAIN**

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. 12333559 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
Alla IVASHCHENKO

Supervisor: Associate Professor, PhD
(Economics)
Ylyana STOROGHILOVA

Reviewer: Professor, Doctor of Economics
Myroslava KORIN

2025

ABSTRACT

This qualification work includes 12 presentation slides, 65 pages of explanatory notes in A4 format and 75 references, summarising the results of research on financial flow management in the supply chain.

Keywords: FINANCIAL FLOWS, SUPPLY CHAIN, LOGISTICS, MULTILEVEL MANAGEMENT SYSTEM, EFFICIENCY, WORKING CAPITAL.

The object of the study is the processes of financial flow management in the supply chain of Metro Cash & Carry.

The aim of the paper is to substantiate and develop a multilevel system for managing the efficiency of financial flows in the supply chain of Metro Cash & Carry in order to enhance liquidity, optimize working capital, and ensure transparency of financial processes.

The paper examines the theoretical foundations of financial flow management in logistics systems, summarizes modern approaches to coordinating financial and material flows in large retail networks, and identifies the key factors influencing financial flow efficiency.

Based on the analysis of Metro Cash & Carry's operations, indicators of financial performance, liquidity, and turnover are assessed, and a system of indicators for monitoring and forecasting the efficiency of financial flows is developed.

A methodology for forming a multilevel financial flow management system is proposed, along with practical recommendations aimed at optimizing working capital, aligning financial and logistics decisions, and improving the efficiency of enterprise resource utilization.

The results of the study can be applied in the activities of large retail enterprises to improve financial flow management systems, strengthen financial stability, and enhance the effectiveness of supply chain management.

АНОТАЦІЯ

Дана кваліфікаційна робота включає 12 слайдів презентації, 65 аркуша пояснівальної записки формату А4 та 75 використаних літературних джерел, у якій узагальнено результати дослідження з управління фінансовими потоками в ланцюгу постачання.

У роботі використано аналітичні, графічні та порівняльні методи дослідження, а також опрацьовано сучасні наукові джерела з логістики та фінансового менеджменту.

Ключові слова: ФІНАНСОВІ ПОТОКИ, ЛАНЦЮГ ПОСТАЧАННЯ, ЛОГІСТИКА, БАГАТОРІВНЕВА СИСТЕМА УПРАВЛІННЯ, ЕФЕКТИВНІСТЬ, ОБОРОТНИЙ КАПІТАЛ.

Об'єктом дослідження є процеси управління фінансовими потоками в ланцюгу постачання підприємства Metro Cash & Carry.

Метою роботи є обґрунтування та розроблення багаторівневої системи управління ефективністю фінансових потоків у ланцюгу постачання Metro Cash & Carry з метою підвищення ліквідності, оптимізації оборотного капіталу та забезпечення прозорості фінансових процесів.

У роботі розглянуто теоретичні засади управління фінансовими потоками в логістичних системах, узагальнено сучасні підходи до координації фінансових і матеріальних потоків у великих роздрібних мережах та визначено фактори, що впливають на ефективність фінансового потоку.

На основі аналізу діяльності Metro Cash & Carry здійснено оцінку показників фінансової результативності, ліквідності та оборотності, а також сформовано систему індикаторів для моніторингу та прогнозування ефективності фінансових потоків.

Розроблено методику формування багаторівневої системи управління фінансовими потоками та надано практичні рекомендації щодо оптимізації оборотного капіталу, узгодження фінансових і логістичних рішень та підвищення ефективності використання ресурсів підприємства.

Отримані результати можуть бути використані в діяльності великих торговельних підприємств для вдосконалення системи управління фінансовими потоками, підвищення фінансової стійкості та ефективності управління ланцюгами постачання.

Ukrainian State University of Railway Transport

Faculty of Economics

Department of Management, Public Administration and HR Technologies

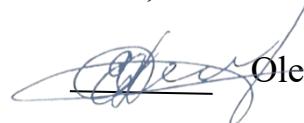
Higher Education Level: Master

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

Alla Ivashchenko

1 Topic «Designing a Multilevel System for Managing the Efficiency of Financial Flows in the Supply Chain»

Supervisor STOROGHILOVA Ylyana, PhD in Economics, Associate 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 reports on the production and economic activities of the enterprise for 2021–2024; enterprise reporting for 2021–2024; regulatory, legislative, and scientific literature on strategic management and logistics activities.

4 Content of the calculation and explanatory note (list of issues to be developed)

The essence of financial flows in logistics systems and their role in ensuring supply chain efficiency. Theoretical approaches and models for managing financial flows at operational, tactical, and strategic levels. The organizational and economic characteristics of Metro Cash & Carry as an object of research and a supply chain participant. The structure and types of the company's financial flows, including cash inflows, expenditures, investment flows, and credit flows. The analysis of the efficiency of Metro Cash & Carry's financial flows using indicators such as turnover, liquidity, solvency, and cost efficiency. Identification of weaknesses, bottlenecks, and inefficiencies in the current financial flow management system of the company. The assessment of risks within financial flows that affect the stability and continuity of supply chain operations. The justification for developing a multilevel financial flow management system tailored to the specifics of Metro Cash & Carry's retail and logistics activities. The design of a multilevel model of financial flow management with a description of the functions of each management level. The evaluation of the

effectiveness of the proposed system and formulation of recommendations to improve financial flow management within the company's supply chain.

5 List of graphic material

1 Theoretical Foundations of the Study of Logistics and Supply Chain Cost Management.

2 Analysis of the Economic and Financial activities of Metro Cash and Carry in the Context of financial flow management.

3 Designing a multilevel system for managing financial flow efficiently in the supply chain of Metro Cash & Carry.

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 Foundations of the Study of Logistics and Supply Chain Cost Management | 10.10.2025 | |
| 2 Analysis of the Economic and Financial activities of Metro Cash and Carry in the Context of financial flow management | 05.11.2025 | |
| 3 Designing a multilevel system for managing financial flow efficiently in the supply chain of Metro Cash & Carry | 08.12.2025 | |
| Graphic part | 10.12.2025 | |

Higher education applicant

Alla IVASHCHENKO

Head

Ylyana STOROGHILOVA

Content

| | |
|---|----|
| Introduction | 7 |
| 1 Theoretical Foundations of the Study of Logistics and Supply Chain Cost Management | 10 |
| 1.1 The Economic Essence and Structure of financial flows in Supply Chain | 10 |
| 1.2 Typology and Classification of Financial Flow management model | 12 |
| 1.3 Factors Influencing Financial Flow efficiency and multilevel optimization approaches | 16 |
| Conclusions to Chapter 1 | 20 |
| 2 Analysis of the Economic and Financial activities of Metro Cash and Carry in the Context of financial flow management | 23 |
| 2.1 General Characteristics of Metro Cash and Carry | 23 |
| 2.2 Analysis of the structure and dynamics of financial flows in Metro Cash and Carry | 26 |
| 2.3 Analysis of the Asset Utilization and Cash flow efficiency | 30 |
| 2.4 Analysis of Labour Resources | 37 |
| 2.5 Analysis of Costs and Production Cost | 41 |
| 2.6. Analysis of Financial Results | 43 |
| Conclusions to Chapter 2 | 48 |
| 3 Designing a multilevel system for managing financial flow efficiency in the supply chain of Metro cash & carry | 51 |
| 3.1 Methodological Approaches to Forming a Multilevel Financial Flow Management System. | 51 |
| 3.2 Development of a Financial Flow Optimization Model for Metro Cash & Carry | 52 |

| Rev. | Sheet | Document No. | Signature | Date | KPM 073. 12333559 П3 | | | |
|-------------------|-------------------|---|-----------|------|---|---------|-------|--------|
| Prepared by | Ivashchenko A.V. |  | | | <i>Designing a Multilevel System for Managing the Efficiency of Financial Flows in the Supply Chain</i> | Ref.. | Sheet | Sheets |
| Reviewed by | Sroroghilova Y.L. |  | | | | | 5 | 65 |
| Standards Control | Krykhtina Y.O. |  | | | | UkrSURT | | |
| Approved by | Dykan O.V. |  | | | | | | |

| | |
|---|----|
| 3.3 Evaluation of the Economic Effect of Implementing the Multilevel System | 53 |
| Conclusions to Chapter 3 | 55 |
| Conclusions | 57 |
| References | 60 |

References

- 1 Christopher, M. Logistics & Supply Chain Management. – 5th ed. – Pearson Education, 2016. URL: <https://www.pearson.com>
- 2 Bowersox, D. J., Closs, D. J., & Cooper, M. B. Supply Chain Logistics Management. – McGraw-Hill Education, 2019.
- 3 Lambert, D. M. Supply Chain Management: Processes, Partnerships, Performance. – 5th ed. – Supply Chain Management Institute, 2020.
- 4 Kuznetsova, O. Adaptive Financial Management in Logistics Chains. – Kyiv: KNEU, 2020.
- 5 Horváth, P. Controlling: Concepts of Management Control, Controllership, and Ratios. – Springer Gabler, 2018.
- 6 Ghadge, A., Kara, M., & Moradlou, H. Digital Transformation in Financial Supply Chain Management. – Journal of Business Logistics, 41(3), 240–258, 2020.
- 7 Baumol, W. J. The Transactions Demand for Cash: An Inventory Theoretic Approach. – Quarterly Journal of Economics, 66(4), 545–556, 1952.
- 8 Miller, M. H., & Orr, D. A Model of the Demand for Money by Firms. – Quarterly Journal of Economics, 80(3), 413–435, 1966.
- 9 Hofmann, E., & Belin, O. Supply Chain Finance Solutions. – Springer, 2011. URL: <https://academic.oup.com/qje>
- 10 Lambert, D. M., & Cooper, M. C. Issues in Supply Chain Management. – Industrial Marketing Management, 29(1), 65–83, 2014.
- 11 Yefymenko, T. Financial Control and Optimization in Ukrainian Logistics Systems. – Kyiv: NDFI, 2019.
- 12 Richards, V. D., & Laughlin, E. J. A Cash Conversion Cycle Approach to Liquidity Analysis. – Financial Management, 9(1), 32–38, 1980.
- 13 Horváth, P. Controlling: Concepts of Management Control, Controllership, and Ratios. – Springer Gabler, 2018.

14 Kuzmin, O. Financial Stability of Logistics Systems in Conditions of Economic Instability. – Lviv: LNU Press, 2019. URL: <https://onlinelibrary.wiley.com>

15 Dikan, V. Financial Logistics and Risk Management in Supply Systems. – Kharkiv: KNEU Press, 2020.

16 METRO AG. Corporate Overview and History. – Annual Report 2023.

17 European Wholesale Association (EWA). The Development of the Cash & Carry Concept. – Brussels, 2022.

18 Metro Cash & Carry Ukraine. Company Facts and Figures. – Official Website, 2024.

19 METRO AG. Sustainability Report: Corporate Responsibility and Strategic Priorities 2023. – Düsseldorf, 2023.

20 Deloitte Ukraine. Integration of Financial and Logistics Systems in Retail Chains. – Kyiv, 2023.

21 PwC Ukraine. Financial Flow Analysis in B2B Distribution Networks. – Kyiv, 2022.

22 Metro Cash & Carry Ukraine. Financial Results Report 2020–2023. – Kyiv, 2023.

23 EY. Digital and Logistics Transformation in Wholesale Trade. – London, 2023. URL: <https://www.pwc.com/ua>

24 KPMG. Cash Flow Management in Turbulent Markets. – London, 2023.

25 Metro Ukraine Press Center. Investment in Logistics Infrastructure and Modernization. – Kyiv, 2024.

26 Statista. Metro AG – Financial Ratios and Asset Productivity Indicators. – 2024.

27 World Bank. Ukraine Business Resilience under Wartime Conditions. – Washington, 2023. URL: <https://www.metro.ua/press-centre>

28 OECD. Financial Adaptability and Liquidity Management Practices in Supply Chains. – Paris, 2024.

29 Armstrong, M. A Handbook of Human Resource Management Practice. – London: Kogan Page, 2022.

30 Metro Cash & Carry Ukraine. Annual Sustainability and HR Report 2024. – Kyiv: Metro AG, 2024.

31 European Retail Association. Labour Market Trends in Wholesale Trade. – Brussels, 2023.

32 Dessler, G. Human Resource Management. – 17th ed. – Pearson Education, 2023.

33 Christopher, M. Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service. – 6th ed. – Pearson, 2022.

34 CIMA. Cost Management and Performance Analysis in Retail Supply Chains. – London: Chartered Institute of Management Accountants, 2024.

35 Kaplan, R. S., & Norton, D. P. The Balanced Scorecard: Translating Strategy into Action. – Harvard Business School Press, 2023.

36 PwC. Global Retail and Consumer Outlook 2024: Digital Transformation and Financial Efficiency in Supply Chains. – London, 2024.37. Wuttke, D., Blome, C., & Henke, M. (2019). Supply Chain Finance: Key Concepts and Strategies. Springer.

37 Achkasova, L. M., & Udodenko, A. V. Механізм управління фінансовими потоками в логістичних системах // Економіка транспортного комплексу. – X., 2020. – С. 141–154. URL: <https://dspace.khadi.kharkov.ua>

38 Аспекти управління фінансовими потоками в логістиці // Економіка транспортного комплексу. – 2018.

39 Cai, Gangshu. Introduction to Supply Chain Finance // Springer, 2024. – p. 3–18.

40 Cai, Gangshu. Supply Chain Finance Characteristics // Springer, 2024. – p. 19–43.

41 Khan, Muhammad Irfan, Syed Imran Zaman, Sharfuddin Ahmed Khan. Supply Chain Finance: Trends, Sustainability and Future Outlook. Routledge, 2026. URL: <https://link.springer.com>

42 Zhao, Lima, & Huchzermeier, Arnd (eds.). Supply Chain Finance: Integrating Operations and Finance in Global Supply Chains. Springer, 2018.

43 Shaikh, Ali Akbar, et al. Supply Chain Finance Modelling and Optimization. Springer, 2024.

44 Sun, Xuefeng. Supply Chain Finance: Credit Empowers the Future. Springer, 2022.

45 Rogers, Dale S., Leuschner, Rudolf, & Choi, Thomas Y. Supply Chain Financing. World Scientific Publishing, 2020.

46 Pawlicka, Kinga & Właszynowicz, Monika. Methods and Performance Measures of Supply Chain Finance // European Proceedings of Social and Behavioural Sciences, 2019.

47 Semaaa, Halima, Zohra Semmab, et al. Systematic Literature Review on Supply Chain Finance. Turkish Online Journal of Qualitative Inquiry (TOJQI), 2021.

48 Молодик, М. & Яновська, В. Управління фінансовими потоками в логістичних системах в сучасних умовах // Економіка та суспільство, 2024.

49 Oriekhova, K. V., & Golovko, O. Cash Flow Management Strategy // Economics and Law, 2022.

50 Lytvynchuk, I., et al. Контролінг та планування грошових потоків на підприємстві, 2024.

51 Шаповал, Л., & Колотій, Ю. Фінансове моделювання управління грошовими потоками страхової компанії. West Ukrainian National University Repository, 2024.

52 Supply Chain Operations Reference (SCOR) Model // ASCM Reference Model.

53 Ніколаєв, Д., & Цевух, С. Сучасне розуміння фінансування ланцюгів постачання // Вчені записки Університету «КРОК», 2025.

54 Jahan, Nusrat. An Empirical Investigation of Cash Conversion Cycle and Profitability. arXiv, 2020.

55 Zhang, Qingkai, L. Jeff Hong & Houmin Yan. Conditional Generative Modeling for Enhanced Credit Risk Management in Supply Chain Finance. arXiv, 2025.

56 Управління фінансовими потоками на підприємстві // Магістр. ua, 2025.

57 Економічна наука: Ways of Improving Cash Flow Management, Kyiv National Economic University Repository, 2025.

58 Management of Financial Flows of Enterprises from the Standpoint of Financial Logistics // Ternopil National Economic University Repository, 2025.

59 Оптимізація ланцюгів постачання через ефективне управління кредиторською заборгованістю // Сталий розвиток економіки, 2025. URL: <https://economdevelopment.in.ua>

60 Simchi-Levi, David; Kaminsky, Philip; & Simchi-Levi, Edith. Designing and Managing the Supply Chain. McGraw-Hill. (класичне джерело із SCM і фінансовою взаємодією).

61 Bowersox, Donald J., Closs, David J., & Cooper, M. B. Supply Chain Logistics Management. McGraw-Hill. (логістика і фінанси).

62 Ross, S. A., Westerfield, R. W., & Jordan, B. D. Fundamentals of Corporate Finance. McGraw-Hill Education, 2022.

63 Jacobs, F. R., & Chase, R. B. Operations and Supply Chain Management. McGraw-Hill, 2021.

64 Christopher, M. Logistics & Supply Chain Management. (відомий класичний підручник).

65 Lambert, D. M., et al. Supply Chain Management: Processes, Partnerships, Performance. (відоме джерело з управління ланцюгами постачання).

66 Ballou, R. H. Business Logistics/Supply Chain Management. (класичний підручник).

67 Lee, H. L., & Billington, C. Managing Supply Chain Inventory: Pitfalls and Opportunities. (класична стаття про синхронізацію потоків).

68 Hofmann, E., & Kotzab, H. Supply Chain Finance and Blockchain Technology. (джерело про SCF та цифрові рішення).

69 Gelsomino, L. M., Mangano, G., et al. Supply Chain Finance: A Literature Review. (оглядова робота).

70 CPFR: Collaborative Planning, Forecasting and Replenishment. VICS Association Standard Documentation. URL: <https://www.gs1.org>

71 Global Supply Chain Forum (GSCF) White Paper. Council of Logistics Management. URL: <https://www.scm-institute.org>

72 SCOR: Supply Chain Operations Reference Model // APICS/ASCM Standards.

73 ISO 31000:2018 Risk Management — Guidelines. (міжнародний стандарт ризик-менеджменту). URL: <https://www.iso.org>

74 Student academic reporting. Text part (explanatory note). General requirements for construction, presentation and design: methodological manual for compliance with the requirements of normative control in student academic reporting / compiled by L. M. Kozar, E. V. Konovalov, A. O. Lapko, O. E. Naumova, G. V. Shapoval, D. V. Shumyk, V. M. Petukhov. Kharkiv: UkrDUZT, 2014. 46 p.

75 Методичні вказівки до виконання кваліфікаційної роботи для здобувачів вищої освіти за другим (магістерським) рівнем спеціальності 073 «Менеджмент» / уклад. О. В. Дикань, Ю. О. Крихтіна; кафедра менеджменту і адміністрування. Харків: УкрДУЗТ, 2021. 35 с.