

**Засновник:**

Національний університет «Львівська політехніка»

**Рік заснування: 2014**

Мова видання англійська

*Рекомендувала до друку та поширення  
через мережу Інтернет Вчена рада  
Національного університету «Львівська політехніка»  
(протокол № 91 від 28 лютого 2023 р.)*

<https://doi.org/10.56318/eem2023.02>

**Свідоцтво про державну реєстрацію  
друкованого засобу масової інформації  
серії KB № 25121-15061 ПР від 07 червня 2022 р.**

**Журнал входить до переліку наукових фахових видань України**

Категорія «Б». Спеціальність – 051 «Економіка»,  
071 «Облік і оподаткування», 072 «Фінанси, банківська справа та страхування»,  
073 «Менеджмент», 075 «Маркетинг»,  
076 «Підприємництво, торгівля та біржова діяльність»,  
232 «Соціальне забезпечення», 281 «Публічне управління та адміністрування»,  
292 «Міжнародні економічні відносини»  
(Наказ Міністерства освіти і науки України від 11 липня 2019 р. № 975)

**Журнал представлено у міжнародних наукометричних базах даних,  
репозитаріях та пошукових системах: DOAJ, Index Copernicus International,  
Business Periodicals Index, EconBiz, Crossref, PBN, UBL, BASE, ErihPlus,  
Національна бібліотека України імені В. І. Вернадського,  
Фахові видання України**

**Контактна адреса:**

Національний університет «Львівська політехніка»  
79013, вул. Степана Бандери, 12, м. Львів, Україна  
E-mail: [info@eem.com.ua](mailto:info@eem.com.ua)  
www: <https://eem.com.ua/uk>

**Founder:**

Lviv Polytechnic National University

**Year of foundation: 2014**

Language: English

*Recommended for printing and distribution  
via the Internet by the Academic Council  
of Lviv Polytechnic National University  
(Minutes No. 91 of February 28, 2023)*

<https://doi.org/10.56318/eem2023.02>

**Certificate of state registration  
of the print media**

Series KV No. 25121-15061 PR of June 07, 2022

**The journal is included in the list of scientific professional publications of Ukraine**

Category “B”. Specialty – 051 “Economics”, 071 “Accounting and Taxation”,  
072 “Finance, Banking and Insurance”, 073 “Management”, 075 “Marketing”,  
076 “Entrepreneurship, Trade and Exchange Activities”, 232 “Social Welfare”,  
281 “Public Management and Administration”, 292 “International Economic Relations”  
(Order of the Ministry of Education and Science of Ukraine of July 11, 2019, No. 975)

**The journal is presented international scientometric databases, repositories  
and scientific systems:** DOAJ, Index Copernicus International, Business

Periodicals Index, EconBiz, Crossref, PBN, UBL, BASE, ErihPlus,  
Національна бібліотека України імені В. І. Вернадського,  
Фахові видання України

**Address for contacts:**

Lviv Polytechnic National University  
79013, 12 Stepan Bandera Str., Lviv, Ukraine

E-mail: [info@eem.com.ua](mailto:info@eem.com.ua)

www: <https://eem.com.ua/en>

## Редакційна колегія

### Головний редактор:

**Олег Кузьмін** Доктор економічних наук, професор, директор інституту економіки і менеджменту, Національний університет «Львівська політехніка», м. Львів, Україна

### Заступник головного редактора:

**Ігор Яремко** Доктор економічних наук, професор, завідувач кафедри обліку та аналізу, Національний університет «Львівська політехніка», м. Львів, Україна

### Відповідальні редактори:

**Ольга Рябкова** Кандидат економічних наук, старший викладач кафедри маркетингу та логістики, Національний університет «Львівська політехніка», м. Львів, Україна

### Національні члени редколегії:

**Ігор Алексєєв** Доктор економічних наук, професор, заслужений працівник освіти України, професор кафедри фінансів, Національний університет «Львівська політехніка», м. Львів, Україна

**Василь Козик** Кандидат економічних наук, професор, завідувач кафедри економіки підприємства та інвестицій, Національний університет «Львівська політехніка», м. Львів, Україна

**Євген Крикавський** Доктор економічних наук, професор, заслужений працівник освіти України, завідувач кафедри маркетингу і логістики, Національний університет «Львівська політехніка», м. Львів, Україна

**Ольга Мельник** Доктор економічних наук, професор, завідувач кафедри зовнішньоекономічної та митної діяльності, Національний університет «Львівська політехніка», м. Львів, Україна

**Наталя Чухрай** Доктор економічних наук, професор, проректор з науково-педагогічної роботи та міжнародних зв'язків, Національний університет «Львівська політехніка», м. Львів, Україна

**Назар Подольчак** Доктор економічних наук, професор, завідувач кафедри адміністративного та фінансового менеджменту Інституту адміністрування та післядипломної освіти, Національний університет «Львівська політехніка», м. Львів, Україна

**Олена Павлова** Доктор економічних наук, професор, завідувач кафедри аналітичної економіки та природокористування, Східноукраїнський Національний університет ім. Лесі Українки, м. Луцьк, Україна

**Володимир Міщенко** Доктор економічних наук, професор, Інститут економіки та прогнозування Національної академії наук України, м. Київ, Україна

**Наталія Трусова** Доктор економічних наук, професор, Таврійський державний агротехнологічний університет імені Дмитра Моторного, м. Мелітополь, Україна

**Вячеслав Македон** Доктор економічних наук, професор, Дніпровський національний університет імені Олеся Гончара, м. Дніпро, Україна

**Тетяна Шталь** Доктор економічних наук, професор, Харківський національний економічний університет ім. Семена Кузнеця, м. Харків, Україна

### Міжнародні члени редколегії:

**Олена Горська** Декан факультету економіки та менеджменту, Словацький університет сільського господарства, м. Нітра, Словаччина

**Збігнев Пастушак** Декан факультету економіки, доктор габілітований, професор факультета економіки, Університет Марії-Кюрі Склодовської, м. Люблін, Польща

**Клеменс Фучс** Доктор економічних наук, професор, Вища школа Нейбрахтенбурського університету прикладних наук, м. Нойбранденбург, Німеччина

**Мирослав Сватос** Доктор економічних наук, професор, Чеський університет природничих наук, м. Прага, Чехія

**Маргарита Наданьова** Професор, Університет Жиліна, м. Жилін, Словаччина

**Лукаш Сулковський** Доктор економічних наук, професор, Ягеллонський університет, м. Краків, Польща

**Володимир Срока** Доктор економічних наук, професор, Університет WBS, м. Домброва-Гурнича, Польща

**Геннадій Чобану** Доктор економічних наук, професор, старший дослідник, Національний науково-дослідницький інститут праці та соціального захисту, м. Бухарест, Румунія

**Ярослав Белас** Кандидат економічних наук, доцент, Університет Александра Дубчека в Тренчині, м. Тренчин, Словаччина

**Якуб Кубічек** Асистент, Університет економіки в Катовіце, м. Катовіце, Польща

**Борис Мітліх** Кандидат економічних наук, Технологічний університет Камбоджі, м. Пномпень, Камбоджа

**Томаш Бернат** Кандидат економічних наук, професор, Щецинський університет, м. Щецин, Польща

**Марцін Станевський** Доцент, проректор з науки, Університет економіки та гуманітарних наук, м. Варшава, Польща

**Йозеф Габанік** Кандидат економічних наук, доцент, Університет Александра Дубчека в Тренчині, м. Тренчин, Словаччина

## Editorial Board

### Editor-in-Chief:

**Oleh Kuzmin** Doctor of Economics, Professor, Director of the Institute of Economics and Management, Lviv Polytechnic National University, Lviv, Ukraine

### Deputy Editor-in-Chief:

**Ihor Yaremko** Doctor of Economics, Professor, Head of the Department of Accounting and Analysis, Lviv Polytechnic National University, Lviv, Ukraine

### Managing Editors:

**Olga Riabkova** PhD in Economics, Senior Lecturer of the Department of Marketing and Logistics, Lviv Polytechnic National University, Lviv, Ukraine

### National Members of the Editorial Board:

**Ihor Aleksieiev** Doctor of Economics, Professor, Honored Worker of Education of Ukraine, Professor of the Department of Finance, Lviv Polytechnic National University, Lviv, Ukraine

**Vasyl Kozyk** PhD in Economics, Professor, Head of the Department of Enterprise and Investment Economics, Lviv Polytechnic National University, Lviv, Ukraine

**Yevhen Krykavskyy** Doctor of Economics, Professor, Honored Worker of Education of Ukraine, Head of the Department of Marketing and Logistics, Lviv Polytechnic National University, Lviv, Ukraine

**Olga Melnyk** Doctor of Economics, Professor, Head of the Department of Foreign Economic and Customs Activity, Lviv Polytechnic National University, Lviv, Ukraine

**Nataliya Chuhray** Doctor of Economics, Professor, Vice-rector for Scientific and Pedagogical Work and International Relations, Lviv Polytechnic National University, Lviv, Ukraine

**Nazar Podolchak** Doctor of Economics, Professor, Head of the Administrative and Financial Management Department of the Institute of Administration and Postgraduate Education, Lviv Polytechnic National University, Lviv, Ukraine

**Olena Pavlova** Doctor of Economics, Professor, Head of the Department of Analytical Economics and Nature Management, East Ukrainian National University named after Lesya Ukrainka, Lutsk, Ukraine

**Volodymyr Mishchenko** Doctor of Economics, Professor, Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine, Kyiv, Ukraine

**Natalia Trusova** Doctor of Economics, Professor, Dmytro Motornyi Tavria State Agrotechnological University, Melitopol, Ukraine

**Viacheslav Makedon** Doctor of Economics, Professor, Oles Honchar Dnipro National University, Dnipro, Ukraine

**Tetiana Shtal** Doctor of Economics, Professor, Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine

### International Members of the Editorial Board:

<b>Elena Horska</b>	Dean of the Faculty of Economics and Management, Slovak University of Agriculture, Nitra, Slovakia
<b>Zbigniew Pastuszak</b>	Dean of the Faculty of Economics, Doctor of habilitation, Professor of the Faculty of Economics, Marie-Curie Sklodowska University, Lublin, Poland
<b>Clemens Fuchs</b>	Doctor of Economics, Professor, Hochschule of Neubrandenburg University of Applied Sciences, Neubrandenburg, Germany
<b>Miroslav Svatos</b>	Doctor of Economics, Professor, Czech University of Life Sciences, Prague, Czechia
<b>Margareta Nadanyiova</b>	Professor, University of Žilina, Žilin, Slovakia
<b>Lukasz Sulkowski</b>	Doctor of Economics, Professor, Uniwersytet Jagielloński, Krakow, Poland
<b>Włodzimierz Sroka</b>	Doctor of Economics, Professor, WBS (Wyższa Szkoła Bankowa) University, Dąbrowa Górnicza, Poland
<b>Ghenadie Ciobanu</b>	Doctor of Economics, Professor, Senior Researcher, National Scientific Research Institute for Labour and Social Protection, Bucharest, Romania
<b>Jaroslav Belás</b>	PhD in Economics, Associate Professor, Alexander Dubček University of Trenčín, Trenčín, Slovakia
<b>Jakub Kubiczek</b>	Assistant, University of Economics in Katowice, Katowice, Poland
<b>Boris Miethlich</b>	PhD in Economics, Professor, IIC University of Technology, Phnom Penh, Cambodia
<b>Tomasz Bernat</b>	PhD in Economics, Professor, University of Szczecin, Szczecin, Poland
<b>Marcin Staniewski</b>	Associate Professor, Vice Rector of Science, University of Economics and Human Sciences, Warsaw, Poland
<b>Jozef Habánik</b>	PhD in Economics, Associate Professor, Alexander Dubček University of Trenčín, Trenčín, Slovakia

## ЗМІСТ/ CONTENTS

<b>О. В. Чернецька, Д. М. Чернецький</b> Аналітичний інструментарій системи управління на підприємстві.....	8
<b>O. Chernetska, D. Chernetskyi</b> Enterprise management system analytical tools.....	8
<b>С. В. Синечко</b> Формування стратегії підвищення якості продукції.....	17
<b>S. Synechko</b> Development of a product quality improvement strategy.....	17
<b>Нованда, Х. Медьяваті</b> Визначальний фактор задоволеності споживачів Shopee Express у Великій Джакарті.....	25
<b>Novanda, H. Medyawati</b> Determinant of Shopee Xpress consumer satisfaction in Jakarta Greater Area.....	25
<b>О. С. Лемішовська</b> Методичний інструментарій в процесах обліку доходів і витрат: сучасні дискусії і розробки в Галичині на рубежі епох.....	35
<b>O. Lemishovska</b> Methodological tools in the processes of income and expenditure accounting: Contemporary discussions and developments in Galicia at the turn of the century.....	35
<b>І. К. Лядський, Т. В. Дядик</b> Управління соціальним інтелектом з позицій оптимізації ціноутворення на ринку праці.....	48
<b>I. Liadskyi, T. Diadyk</b> Managing social intelligence from the perspective of optimising labour market pricing.....	48

UDC 658:005.3:004.02

DOI: 10.56318/eem2023.02.008

**Olga Chernetska\***

PhD in Economics, Associate Professor  
Dnipro State Agrarian and Economic University  
49600, 25 S. Yefremov Str., Dnipro, Ukraine  
<https://orcid.org/0000-0002-4691-636X>

**Dmytro Chernetskyi**

Applicant for a Master's Degree in Higher Education  
Taras Shevchenko National University of Kyiv  
01033, 60 Volodymyrska Str., Kyiv, Ukraine  
<https://orcid.org/0009-0001-0514-0323>

## Enterprise management system analytical tools

**Abstract.** High-quality information and analytical content can be used as a basis for making optimal and informed management decisions by analysing the impact of factors on business efficiency, which will allow us to explore the weaknesses of an enterprise and plan the directions of its strategic development. The study aims to provide a scientific synthesis of theoretical aspects and outline practice-oriented approaches to organising analytical support for the management system at an enterprise. The following methods were used: theoretical aspects were analysed using the generalisation, systematisation and grouping methods; the use of statistical analysis and business process modelling methods for the needs of enterprise management was analysed; the components of Data Science analysis were considered; the main material was presented using the descriptive method. Analytical tools of the enterprise management system were analysed. The emphasis is placed on the procedures of statistical analysis and modelling of business processes, application of Data Science tools and visualisation methods. The external and internal sources of information for the needs of enterprise management are allocated. Varieties of analytical tools that contribute to understanding the essence of problematic issues and determine the search for optimal and reasonable management decisions are presented. The SWOT-analysis matrix as an instrument for optimal combination of information modelling methods, analytical procedures and visualisation of the analysis results is presented. The need to use IT tools to improve the quality of the results of analytical procedures is emphasised. The expediency of developing analytical tools for the needs of optimising the enterprise management system using Data Science technology is substantiated. The advantages of using Big Data for making management decisions are determined. The components of Data Science analysis in the enterprise management system are allocated. The possibility of solving business problems or determining the enterprise development strategy by structuring and visualising a large array of data to identify patterns of enterprise development is emphasised. The tools of analytical support for the needs of organising the system of economic security of enterprise are generalised. The practical value of the work lies in the fact that an algorithm of actions for organising analytical support of the management system at an enterprise is proposed

**Keywords:** information and analytical content; management process; optimisation of analytical support; information modelling of business processes; Data Science technology

---

**Article's History:**

Received: 31.08.2023

Revised: 13.11.2023

Accepted: 16.12.2023

**Suggested Citation:**

Chernetska, O., & Chernetskyi, D. (2023). Enterprise management system analytical tools. *Economics, Entrepreneurship, Management*, 10(2), 8-16. doi: 10.56318/eem2023.02.008.

\*Corresponding author



Copyright © The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

## INTRODUCTION

An effective management system at an enterprise should be built on the use of optimal tools. One of the ways to optimise the management system of a business entity is to apply analytical procedures that will help to obtain high-quality and timely information content to prevent risks in the internal business environment. Analytical tools allow for the identification of problematic aspects of the enterprise's activities, assess the impact of factors, and develop directions for eliminating the negative impact of factors with further development of a development strategy. Interpretation of the results of the performance analysis helps to improve the efficiency of the management system at the enterprise. Scientists pay attention to research on the use of IT technologies in management decision-making. Analytical IT tools should be applied to a sufficient amount of qualitative and operational information, which will allow to effectively integrate research results into the management process at the enterprise.

I. Khvalchuk & L. Voloshchuk (2020) emphasise the importance of an adequate response of a business entity to market requirements, changing business environment, and customer requests. According to the scientists, such a reaction is possible in the presence of high-quality information content and its reasonable analysis. S. Skochyliak (2019) emphasises that information content serves as the basis for further analytical procedures to study trends, the impact of factors, the interconnection of these factors and their impact on the cost structure of a business entity. The expert also notes the need for constant, prompt, and systematic analysis of information on the activities of the enterprise, which will allow timely response to negative trends and support positive changes in business processes.

Zh. Kononenko *et al.* (2020) agree that high-quality information and analytical content should be the basis of the management process at the enterprise, starting with the development and planning of management actions. P. Putsenteilo & O. Humeniuk (2019) note that external and internal information should become the basis for the management system of an enterprise and be integrated into the management process as a whole.

Scientists consider Big Data analytics to be an effective tool for the management decision-making system at an enterprise. For instance, V. Lysak (2020) considers the structure of the decision-making system by levels of enterprise management, describes the impact of factors on management actions and identifies areas for improving the efficiency of the decision-making module as part of an integrated enterprise management system. In particular, the scientist summarises and describes the main stages of the management process, where each of the presented stages can be performed using IT tools.

According to O. Halan *et al.* (2022), the sustainable development of a business entity can be ensured by high-quality analytical tools. In particular, the authors assessed the advantages and identified threats in integrating Big Data tools into the management system of an enterprise, in particular in terms of applying an innovative approach to the

formation of the required level of economic security of an enterprise.

O. Balabanov (2019) investigated the fundamental provisions of analytics of a significant data set. The author summarised the aspects of integrating analytical procedures into the digitalised management system of a business entity by applying the proposed sequence of analytical actions and also announced further research on the review of analytical procedures in the field of Big Data.

O. Chubukova *et al.* (2020) noted current trends in the development of machine learning as a component of Data Science. In their research, the scientists analysed the peculiarities of the dissemination of Data Science technologies employing specific digital tools that allow obtaining the necessary amount of operational information and conducting its in-depth analysis available for optimising the management decision-making process. Scientists emphasise that the use of a set of Data Science algorithms (in the example of the banking sector) can ensure an increase in the efficiency of risk modelling by employing specific digital tools and relevant IT products (specialised programming languages such as Python and R, quantitative machine learning methods, neural networks).

I. Radionova & Ya. Fareniuk (2021) define Data Science tools as the most relevant for analysing the economy of uncertainty. Using specific examples, the authors summarised the capabilities of Data Science in the management decision-making process. In particular, the researchers concluded that the use of Data Science tools allows for assessing the impact of factors on processes and phenomena, uncontrollable chaos of events, and unexpected combinations of tools. Similar conclusions were reached by L. Chagovets *et al.* (2020), who assessed the development of Ukrainian regions using the above tools.

The external business environment creates both opportunities and threats that need to be considered. The study aimed to analyse an effective management system and the required level of economic security for the formation of a business entity's development strategy.

## MATERIALS AND METHODS

The informational basis of the study includes scientific articles of Ukrainian and world experts on the issues of analytical support of the management system at enterprises, fundamental research of individual specialists, as well as the authors' achievements in the course of scientific and professional activities. The study was conducted in the context of a systematic approach, which allowed the analysis of theoretical aspects and outline of practice-oriented approaches to organising analytical support of the management system at an enterprise. In particular, the theoretical developments of scientists on the management process at an enterprise were systematised. In general, the works of Ukrainian specialists were chosen as the basis for generalisation. The method of grouping allowed the formulation of the basic requirements for the process of making optimal

and reasonable management decisions. The works of international experts contributed to the experience of entrepreneurs' response to the challenges of the modern business environment. The authors' opinions were presented as research results using the descriptive method. In particular, the sources of information for optimising the management process were identified, the tools of statistical analysis for management needs were presented, and the methodology for information modelling of business processes was specified. The article summarises the opinions of scientists on the advantages and components of Data Science analysis. The method of logical and consequential connection provided an opportunity to develop practice-oriented approaches to building high-quality analytical support for the process of making optimal management decisions.

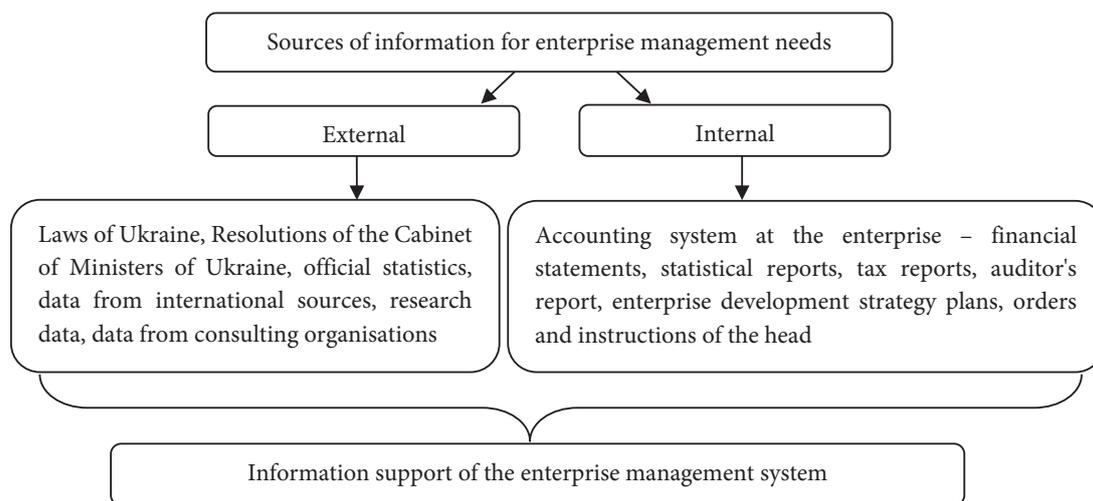
The analysis of the studies also contributed to outlining the directions of integration of the world experience of business management into the current realities of Ukrainian business entities. In particular, developments of Ukrainian scientists were used to identify the main principles of optimisation of analytical support of the process of making managerial decisions at an enterprise. The study was based on the scientific works of Ukrainian scientists to develop proposals on the specifics of entrepreneurial activity in the context of modern business requirements and regulatory policy in the country. These information sources in the field of regulatory and legal support for business entities registered in Ukraine will allow them to act effectively within the framework of legislation even when conducting international activities.

The study deals with interrelated scientific areas, in particular, the problems of information and accounting

support of business entities, business analytics of economic processes, aspects of the management process at the enterprise, as well as computer data processing. The knowledge and skills in the field of financial and statistical accounting, basics of enterprise reporting, statistics and analysis of economic activity, enterprise management, information technology, and research methodology were used. This research area provided a basis for the expediency of broad application of Data Science technology to develop optimal management solutions for the needs of the strategic and tactical development plan of a business entity. To visualise the results of the study, tabular and graphical methods were used.

## RESULTS AND DISCUSSION

Information sources for management needs can be distinguished according to external and internal factors (Fig. 1). O. Sytnichenko (2021) notes that the protection of information content should be the object of attention of state authorities in the context of regulatory and legal regulation. The management system of a business entity should be built on the current regulations on the regulation of business processes, and the formation of accounting content as a reliable source of information for the needs of making optimal and timely management decisions. Modern scientific research will help specialists integrate innovative tools into the management process of a business entity. Consulting organisations, including audit firms, can provide expert assistance in developing and arguing for the optimal tools of the business management system. Prompt and accurate information will make it possible to build an effective business development strategy and ensure the required level of economic security for a business entity.



**Figure 1.** Sources of information for enterprise management needs

**Source:** developed by the authors

As noted by I. Yaremko (2022), the basis for managing business processes is accounting and analytical data. This opinion is also shared by O. Polishchuk & V. Melnyk (2022), noting that the effectiveness of information and

analytical support depends on accounting information that affects the financial and economic security of an enterprise. I. Khvalchuk & L. Voloshchuk (2020) note that the provision of operational analytical information can ensure informed

management decisions. Zh. Kononenko *et al.* (2023) note the need to have IT skills to fully use accounting information for its analysis, which will allow to establish management actions and monitor their effective implementation. The authors of this article agree with the conclusions reached by the following scholars. O. Mykoliuk & V. Bobrovnyk (2021) note that nowadays any business is closely related to the development of digital processes. This opinion is also shared by P. Putsenteilo & O. Humeniuk (2019), noting that without IT solutions, it is impossible to process available information resources quickly and efficiently. Software products available in the modern IT environment allow for improving the quality of the results of analytical procedures.

The quality of the information content of a business entity depends on the construction of the accounting system. All accounting data are summarised in the financial, tax and statistical reports of the business entity, which are the basis for applying analytical procedures to develop optimal management decisions. The statistical reporting of an individual business entity becomes a component of the statistical data set of a region, industry, country, or the world. It is this array that is also of interest to management system specialists, but at the same time requires an innovative approach, modern digital tools, and skills. N. Khorunzhak *et al.* (2019) emphasise that even the automated accounting process does not fully implement the function of control and analysis, which limits the capabilities of managers in information modelling of business processes.

V. Nekhai & V. Nekhai (2020) formulated the concept of high-quality information support of the management system at an enterprise as a set of methodological techniques for systematising data, analysing them, and effectively and comprehensively interpreting the results of the analysis under the influence of factors that will ensure optimisation of management decisions and their effective implementation. A large number of scientists are expanding the tools for analytical support of the economic security system of an enterprise in the strategic and tactical aspects. In particular, experts distinguish the tools for analytical support of the enterprise management system in terms of tactical and strategic planning, the tactical tools include “relevant

analysis, operational analysis, margin analysis, CVP analysis, operational pricing”. At the same time, the strategic plan, according to scholars, should be based on such tools as “investment analysis, strategic analysis, strategic pricing, life cycle analysis, business process mapping, ABC analysis, SWOT analysis” (Putsenteilo & Humeniuk, 2019).

According to T. Suhak (2018), accounting information is an important resource, but it is necessary to consider modern processing methods to diagnose the state of financial and economic security of the enterprise, and to identify and eliminate external threats in the process of making management decisions. However, the authors of this study share the opinion that analytical procedures should be carefully planned to prevent unnecessary actions and irrelevant information (Skochylas, 2019). I. Belousova & T. Suhak (2019) emphasise the expediency of using modern methods of information protection for the needs of economic security of an enterprise. This opinion is shared by S. Lehenchuk *et al.* (2021), noting that credentials are confidential information, the loss of which in the context of the development of information technology can lead to reputational threats and financial losses. Thus, optimising the process of information content formation and its subsequent in-depth analysis is currently an important challenge for an enterprise in the context of ensuring the required level of economic security.

Information modelling plays an important role in the enterprise management system. Visualisation methods increase the understanding of the problematic issues and facilitate the search for optimal and reasonable management decisions. Such a tool as SWOT analysis combines the features of information modelling, analytical procedures, and visualisation of the analysis results. The analysis of an information resource is necessary to identify possible threats to management decision-making to counteract the negative impact of factors (Voroniuk, 2021). Scientists suggest visualising the results of such an analysis in the form of a SWOT analysis matrix (Tyurina *et al.*, 2022). The matrix of SWOT analysis of building information and analytical content to ensure the required level of economic security of the enterprise through the author’s view is presented in Table 1.

**Table 1.** Matrix of SWOT-analysis of building information and analytical content to ensure the required level of economic security of the enterprise

Possibilities	Threats
Investment attractiveness increases; Business activity increase; Company solvency improvement; Business expansion in the process of European integration.	Instability in the macroeconomic environment; Increased competition; Unauthorised information access; Analytical data representativeness errors.
Advantages	Disadvantages
Informed management decision-making; Information support digitalisation; High-quality analytical tools.	Insufficient enterprise financial stability; Low level of state support; Lack of analyst positions at enterprises; Lack of economic security services at enterprises.

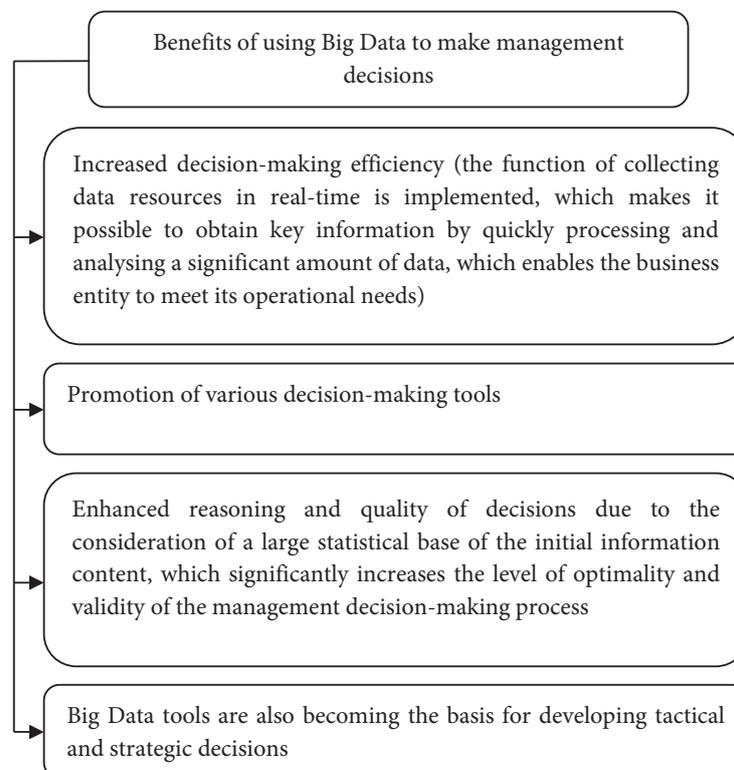
**Source:** developed by the authors

The SWOT analysis results of the analytical support organisation enable the development of measures to use business development opportunities, prevent the negative impact of threats, and combine the strengths and weaknesses of the enterprise to increase the level of economic security of the business entity.

It is worth noting that the process of management at an enterprise is characterised by the uncertainty of the operating conditions, which are influenced by external and internal factors, so the combination of external and internal data for its analysis is of particular relevance. Scientists emphasise the need to use special tools for analytical support of the management decision-making process. I. Radionova & Ya. Farenjuk (2021) suggest using Data Science tools for analytical support of the management decision-making process in an uncertain economy. In their opinion, the Data Science tool helps to implement a relevant analysis of

business processes in an uncertain business environment by identifying non-obvious relationships. At the same time, world experts have conducted fundamental research on analytical thinking, and principles of collecting and analysing valuable data for business needs (Provost & Fawcett, 2020).

L. Samoylenko (2018) suggests that with the development of the digitalisation of business processes, the number of IT tools offered is growing, which allows obtaining a variety of data for making management decisions through the analysis of a large amount of data (Big Data). Regarding the complexities and benefits of using Big Data, O. Chubukova *et al.* (2020) note that the high quality of predictive models is associated with a high cost of time and resources, complexity of calculation, and the need to use modern IT solutions. However, most scientists identify the following advantages of using Big Data in enterprise management (Fig. 2).



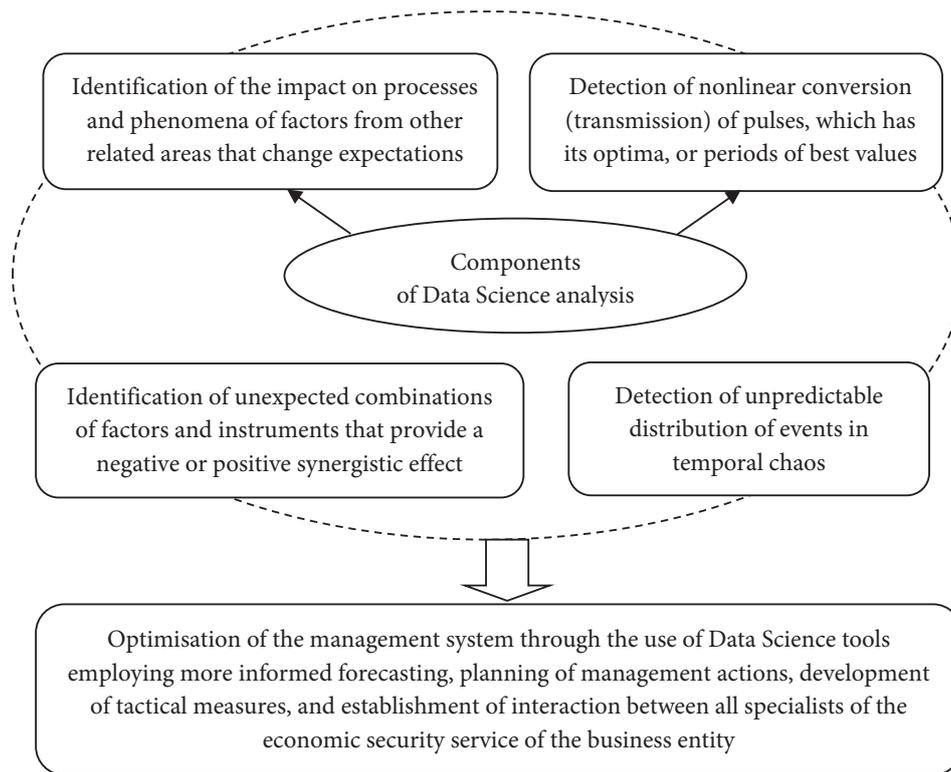
**Figure 2.** Benefits of using Big Data to make management decisions

**Source:** compiled by the authors based on O. Halan *et al.* (2022)

The Data Science tool analyses information using a foundation from various scientific fields of economic and mathematical direction, so it is difficult to overestimate its value in the face of uncertainty in business processes, as mathematical methods allow identifying significant factors and calculating quantitative and qualitative indicators of their impact (Radionova & Farenjuk, 2021). International experience shows a wide range of applications of this tool. In particular, I. Carmichael & J.S. Marron (2018) emphasise the continuous development of statistical methods in the context of business analysis. The authors emphasise the

combination of analysis methods with search analysis, machine learning technology, and game theory. C. Weihs & K. Ickstadt (2018) emphasise the need to apply a set of actions related to statistical methods, information technology, management, and communication principles. This implies that the combination of interrelated but self-sufficient tools in the management process will allow for a synergistic effect.

The implementation of Data Science technology in the field of management decision-making involves optimising the management system at an enterprise and includes the following components of Data Science analysis (Fig. 3).



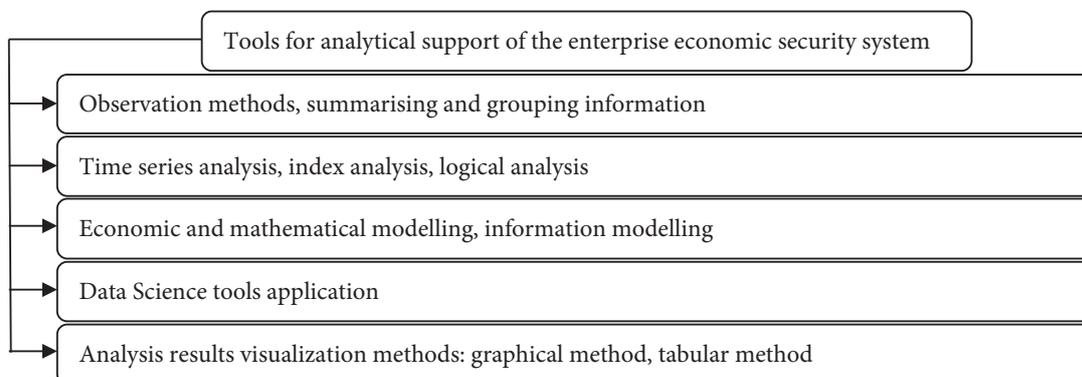
**Figure 3.** Components of Data Science analysis in the management system of a business entity

**Source:** compiled by the authors based on I. Radionova & Ya. Farenjuk (2021)

As such, the conducted literature analysis of scientific works demonstrates the relevance and feasibility of using analytical tools, including Data Science technologies, in the field of management decision-making. Data Science tools are gaining relevance in the development of optimal and sound management decisions. These advantages make it possible to assert the effectiveness of using this toolkit to formulate an enterprise development strategy based on tactical decisions through the collection, analysis, visualisation, and interpretation of a large array of data. A Data Science specialist can collect, analyse, visualise, and interpret large amounts of data using various tools to identify patterns that can be used to solve business problems or determine the company’s development strategy. In particular, the

practical use of economic and mathematical tools will allow us to identify weaknesses in the company’s activities, assess the risks of production and sales activities, and make forecasts of performance through the structuring and visualisation of a large data set. This will ensure the development of measures to use opportunities, prevent the negative impact of threats, and combine the strengths and weaknesses of the enterprise to make optimal management decisions.

The analytical tools for the needs of management and the formation of the required level of economic security of a business entity should include elements of statistical analysis, information and economic-mathematical modelling of business processes and Data Science tools, as summarised in Figure 4.

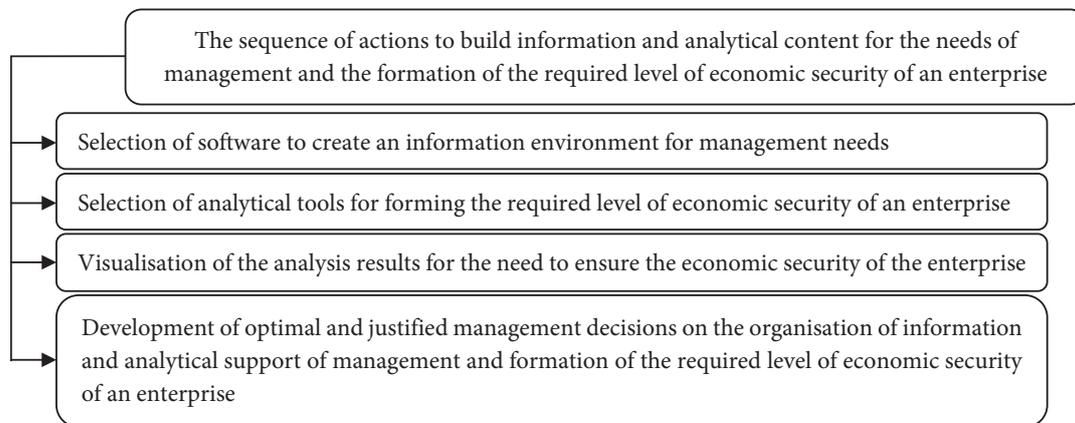


**Figure 4.** Tools for analytical support of the economic security system of a business entity

**Source:** developed by the authors

It is necessary to develop an appropriate algorithm of actions for building information and analytical content for the needs of management and forming the required level of

economic security of an enterprise. The following sequence of actions is advisable (Fig. 5).



**Figure 5.** Algorithm of actions for building information and analytical content for the needs of management and formation of the required level of economic security of an enterprise

**Source:** developed by the authors

Optimisation of optimal and sound management decisions requires managers to be aware of and possess the necessary skills to apply specialised digital tools for analysis needs, the ability to apply scientific methods and techniques, as well as a modern and creative approach to interpreting analysis results, responding quickly to the challenges of the modern business environment and adjusting decisions to meet the urgent needs of the business.

## CONCLUSIONS

As such, the decision-making efficiency depends on the tools of a business entity's management system. Analytical procedures can become the basis for obtaining a high-quality and timely information resource to eliminate the negative impact of business environment risks. Sources of information can be identified according to external and internal factors. The quality of information will ensure the development of an effective development strategy in the context of the financial and economic security of a business entity. The source of internal information is the accounting content concentrated in the financial, tax and statistical reporting of the business entity, based on which it is advisable to build the analytical component of the management system. The source of external information, in addition to information from regulations and data from consulting companies, is a statistical array of data of a region, industry, country, and the world, formed as a set of statistical reporting data of individual business entities.

The quality requirements for an information resource create new challenges for a business entity in the context of ensuring the required level of economic security, since data processing (both internal and external) requires special skills in various fields, including specialised IT solutions. Analytical tools are effective when combining elements of statistical analysis, information, and economic and mathematical modelling of business processes, as well as Data Science tools, which will provide a synergistic effect in the formation of a strategic and tactical plan for the development of the enterprise. The integration of the above approaches into the enterprise management system increases the requirements for economic security specialists, in particular, the availability of skills in the use of specialised digital tools, the use of modern approaches to interpreting the results of analysis with the ability to quickly respond to external challenges and adjust decisions following the needs of the business environment. The widespread use of Data Science technology to develop optimal management decisions for a business entity is a prospect for further research.

## ACKNOWLEDGEMENTS

None.

## CONFLICT OF INTEREST

None.

## REFERENCES

- [1] Balabanov, O. (2019). Big Data analytics: Principles, directions and tasks (review). *Scientific Journal Problems of Programming*, 2, 47-68. doi: 10.15407/pp2019.02.047.
- [2] Belousova, I., & Suhak, T. (2019). Priority directions for improving the information and analytical provision of the financial component of the system of economic security of enterprises. *Scientific Notes of the University "KROK"*, 2(54), 199-204. doi: 10.31732/2663-2209-2019-53-199-204.

- [3] Carmichael, I., & Marron, J.S. (2018). Data Science vs. statistics: Two cultures? *Japanese Journal of Statistics and Data Science*, 1, 117-138. doi: [10.1007/s42081-018-0009-3](https://doi.org/10.1007/s42081-018-0009-3).
- [4] Chagovets, L., Prokopovych, S., & Kholod, V. (2020). Data Science methods for comprehensive assessment of regional economic development. *Development Management*, 18(2), 43-56. doi: [10.21511/dm.18\(2\).2020.05](https://doi.org/10.21511/dm.18(2).2020.05).
- [5] Chubukova, O., Ponomarenko, I., & Domantovych, O. (2020). Using Data Science for risk assessment. *Market Infrastructure*, 47, 129-132. doi: [10.32843/infrastruct47-24](https://doi.org/10.32843/infrastruct47-24).
- [6] Halan, O., Skoromnyi, V., & Pustovit, N. (2022). Big Data technologies application in the activities of modern enterprises. *Norwegian Journal of Development of the International Science*, 95, 64-68. doi: [10.5281/zenodo.7258922](https://doi.org/10.5281/zenodo.7258922).
- [7] Khorunzhak, N., Brukhanskyi, R., & Ivanyshyn, V. (2019). Logic-statistical information models in control function of accounting. *Independent Journal of Management & Production*, 10(7), 846-871. doi: [10.14807/ijmp.v10i7.906](https://doi.org/10.14807/ijmp.v10i7.906).
- [8] Khvalchuk, I., & Voloshchuk, L. (2020). Summary of information-analytical safety management of enterprise. *ECONOMICS: Time Realities*, 1(47), 84-90. doi: [10.15276/ETR.01.2020.10](https://doi.org/10.15276/ETR.01.2020.10).
- [9] Kononenko, Zh., Hrybovska, Yu., & Karnaukhova, H. (2023). Information and analytical support in the enterprises management system. *Economy and Society*, 47. doi: [10.32782/2524-0072/2023-47-74](https://doi.org/10.32782/2524-0072/2023-47-74).
- [10] Kononenko, Zh., Khodakivska, L., & Hrybovska, Yu. (2020). Economic information as an enterprise management instrument. *Modern Economics*, 19, 83-87. doi: [10.31521/modecon.V19\(2020\)-14](https://doi.org/10.31521/modecon.V19(2020)-14).
- [11] Lehenchuk, S., Horodysky, M., & Maistrenko, N. (2021). Protection of accounting data in the conditions of using Internet of Things: Problems and prospects of accounting digitalization. *Accounting and Finance*, 1(91), 12-19. doi: [10.33146/2307-9878-2021-1\(91\)-12-19](https://doi.org/10.33146/2307-9878-2021-1(91)-12-19).
- [12] Lysak, V. (2020). Formation of the systems that support management decisions based on IT-tools. *European Journal of Economics and Management*, 6(1), 41-50. Retrieved from [https://eujem.cz/wp-content/uploads/2020/eujem\\_2020\\_6\\_1/08.pdf](https://eujem.cz/wp-content/uploads/2020/eujem_2020_6_1/08.pdf).
- [13] Mykoliuk, O., & Bobrovnyk, V. (2021). Peculiarities of information support for enterprise management. *Bulletin of the Khmelnytskyi National University*, 3, 48-52. doi: [10.31891/2307-5740-2021-294-3-7](https://doi.org/10.31891/2307-5740-2021-294-3-7).
- [14] Nekhai, V., & Nekhai, V. (2020). Information and analytical support of the management of financial and economic security of agricultural enterprises based on the strategy of cyber situation awareness. *Problems and Prospects of Economics and Management*, 1(21), 238-247. doi: [10.25140/2411-5215-2020-1\(21\)-238-247](https://doi.org/10.25140/2411-5215-2020-1(21)-238-247).
- [15] Polishchuk, O., & Melnyk, V. (2022). Information and analytical support of accounting and financial components of the agricultural enterprises' economic security system. *Black Sea Economic Studies*, 74, 221-226. doi: [10.32843/bses.74-33](https://doi.org/10.32843/bses.74-33).
- [16] Provost, F., & Fawcett, T. (2020). *Data Science for business. How to collect, analyze and use data*. Kyiv: Nash Format.
- [17] Putsenteilo, P., & Humeniuk, O. (2019). Information support of analytical activity in the company management. *The Institute of Accounting, Control and Analysis in the Globalization Circumstances*, 1-2, 74-82. doi: [10.35774/ibo2019.01.074](https://doi.org/10.35774/ibo2019.01.074).
- [18] Radionova, I., & Fareniuk, Ya. (2021). Analysis based on databases (Data Science) for management decisions taking into account the uncertainty of the macro and microeconomic levels. In *Economics of uncertainty: Content, assessment, regulation* (pp. 99-121). Kyiv: KROK University. Retrieved from <https://monograph.krok.edu.ua/books/catalog/book/19>.
- [19] Samoylenko, L. (2018). Opportunities and problems of using Big Data technologies by domestic companies. *Efektivna Ekonomika*, 1. Retrieved from <http://www.economy.nayka.com.ua/?op=1&z=6066>.
- [20] Skochylias, S. (2019). Analytical support as a source of information for making managerial decisions. *Scientific Bulletin of the Uzhhorod National University. Series: International Economic Relations and World Economy*, 25(2), 123-127. Retrieved from [http://nbuv.gov.ua/UJRN/Nvuumevcg\\_2019\\_25%282%29\\_27](http://nbuv.gov.ua/UJRN/Nvuumevcg_2019_25%282%29_27).
- [21] Suhak, T. (2018). Features of information and analytical support of the financial component of the enterprise economic security system. *Scientific Notes of the University "KROK". Series: Economics*, 3, 187-194. Retrieved from <http://www.irbis-nbuv.gov.ua/cgi-bin/>.
- [22] Sytnichenko, O. (2021). Certain aspects of regulatory and legal regulation of information security. *Scientific Notes of Vernadskyi National University. Series: Legal Sciences*, 32(71(1)), 86-90. doi: [10.32838/TNU-2707-0581/2021.1/15](https://doi.org/10.32838/TNU-2707-0581/2021.1/15).
- [23] Tyurina, H., Nazarchuk, T., & Shkabara, H. (2022). Formation of information and analytical support of business project management of the enterprise. *Innovation and Sustainability*, 2, 68-77. doi: [10.31649/ins.2022.2.68.77](https://doi.org/10.31649/ins.2022.2.68.77).
- [24] Voroniuk, Ye. (2021). Information and analytical support as an element of the organization of economic security of entrepreneurial activity. *Bulletin of the Volodymyr Dahl East Ukrainian National University*, 6(270), 83-87. doi: [10.33216/1998-7927-2021-270-6-77-81](https://doi.org/10.33216/1998-7927-2021-270-6-77-81).
- [25] Weihs, C., & Ickstadt, K. (2018). Data Science: The impact of statistics. *International Journal of Data Science and Analytics*, 6, 189-194. doi: [10.1007/s41060-018-0102-5](https://doi.org/10.1007/s41060-018-0102-5).
- [26] Yaremko, I. (2022). Accounting and analytical support as a tool for managing the economic development of the enterprise. *Problems of Modern Transformations. Series: Economics and Management*, 6. doi: [10.54929/2786-5738-2022-6-09-02](https://doi.org/10.54929/2786-5738-2022-6-09-02).

### **Ольга Віталіївна Чернецька**

Кандидат економічних наук, доцент  
Дніпровський державний аграрно-економічний університет  
49600, вул. С. Єфремова, 25, м. Дніпро, Україна  
<https://orcid.org/0000-0002-4691-636X>

### **Дмитро Максимович Чернецький**

Здобувач магістерського рівня вищої освіти  
Київський національний університет імені Тараса Шевченка  
01033, вул. Володимирська, 60, м. Київ, Україна  
<https://orcid.org/0009-0001-0514-0323>

## **Аналітичний інструментарій системи управління на підприємстві**

**Анотація.** Якісний інформаційно-аналітичний контент може бути основою для прийняття оптимальних та обґрунтованих управлінських рішень завдяки аналізу впливу чинників на ефективність бізнесу, що дозволить дослідити слабкі місця суб'єкта підприємництва та спланувати напрямки його стратегічного розвитку. Метою дослідження є наукове узагальнення теоретичних аспектів і окреслення практико орієнтованих підходів до організації аналітичного забезпечення системи управління на підприємстві. Під час дослідження було використано наступні методи: теоретичні аспекти проаналізовано за допомогою методів узагальнення, систематизації та групування; проаналізовано використання методів статистичного аналізу та моделювання бізнес-процесів для потреб управління на підприємстві, розглянуто складові Data Science-аналізу; виклад основного матеріалу наведено за допомогою описового методу. У статті проаналізовано аналітичний інструментарій системи управління на підприємстві. Акцентовано на процедурах статистичного аналізу та моделювання бізнес-процесів, застосуванні інструментарію Data Science та методів візуалізації. Виокремлено зовнішні і внутрішні джерела інформації для потреб управління на підприємстві. Наведено різновиди аналітичного інструментарію, що сприяють розумінню сутності проблемних питань та обумовлюють пошук оптимальних та обґрунтованих управлінських рішень. Наведено матрицю SWOT-аналізу як інструменту оптимального поєднання методів інформаційного моделювання, аналітичних процедур та візуалізації результатів аналізу. Наголошено на необхідності використання ІТ-інструментів для підвищення якості результатів аналітичних процедур. Обґрунтовано доцільність розробки аналітичного інструментарію для потреб оптимізації системи менеджменту підприємства за допомогою технології Data Science. Визначено переваги застосування великих даних для прийняття управлінських рішень. Виокремлено складові Data Science-аналізу в системі управління підприємством. Наголошено на можливості вирішення бізнес-проблем або визначення стратегії розвитку підприємства за допомогою структуризації та візуалізації великого масиву даних для виявлення закономірностей розвитку підприємства. Узагальнено інструментарій аналітичного забезпечення для потреб організації системи економічної безпеки підприємства. Практична цінність роботи полягає в тому, що запропоновано алгоритм дій щодо організації аналітичного забезпечення системи управління на підприємстві

**Ключові слова:** інформаційно-аналітичний контент; процес управління; оптимізація аналітичного забезпечення; інформаційне моделювання бізнес-процесів; технологія Data Science

UDC 658.56

DOI: 10.56318/eem2023.02.017

**Sergii Synechko\***

Postgraduate Student

European University

02000, 16V Academician Vernadsky Blvd., Kyiv, Ukraine

<https://orcid.org/0009-0001-0602-4068>

## Development of a product quality improvement strategy

**Abstract.** In modern competitive conditions, product quality is becoming one of the main indicators that users pay attention to when choosing a product. Thus, it is relevant to analyse the process of forming a high-quality production strategy. The purpose of this study is to analyse the methods of forming a strategy for improving product quality based on examples of individual companies. The main research methods used in the study were: analysis, forecasting, historical, etc. The paper examines certain methods of product quality management, namely: Lean Management, Six Sigma, Theory of Constraints, and Total Quality Management. Their features, purpose of use, and implementation stages were outlined. In particular, it was shown that the main goal of Lean Management is to reduce time and costs to ensure high quality standards, while Total Quality Management is more focused on investigating customer preferences and optimising the internal motivations of company employees. Thus, it was concluded that each of the methods can be used by different companies at different times and lead to different performance indicators. This indicates the relevance and necessity of conducting separate research by the company's managers to choose the approach that will be most effective for them. In addition, the implementation of these methods in individual enterprises was evaluated, and the problems and advantages that were obtained from them were described. The conducted research brings new knowledge to the theory of marketing, and its conclusions can be used by companies in practice, for example, during the process of creating their own competitive strategy in the market

**Keywords:** entrepreneurship; marketing; economy of Ukraine; competition; sales

### INTRODUCTION

In modern conditions, competition between enterprises is growing at a significant pace. This is conditioned by both rapid changes in technologies (the need for companies to be able to adapt to them quickly) and high attention to the quality of products and services (due to increased customer demand). Another crucial factor has been globalisation, as businesses are trying to enter the global market and compete in it, which requires even more effort. Therefore, companies are forced to apply various strategies to improve their own competitive positions.

One of these strategies is to improve the quality of products. As noted above, especially in developed countries, it is not the price that plays an increasingly important role, but the usefulness of products, the possibility of their long-term

use, etc. Thus, if earlier the main goal of enterprises was to get the opportunity to reduce the price of their products as much as possible, now they have many options for their own development. This also results in market segmentation. However, product quality improvement strategies vary and may vary depending on the industry and individual enterprise. Therefore, it remains relevant to evaluate existing methods and to study real-world use cases for various strategies. This is especially relevant for Ukraine, which is at war, and therefore requires special efforts on the part of enterprises to be able to function in the current conditions.

A significant number of researchers were engaged in assessing the current features of the development of Ukraine and its enterprises. L. Pronko & K. Tokar (2022)

#### Article's History:

Received: 17.09.2023

Revised: 15.11.2023

Accepted: 16.12.2023

#### Suggested Citation:

Synechko, S. (2023). Development of a product quality improvement strategy. *Economics, Entrepreneurship, Management*, 10(2), 17-24. doi: 10.56318/eem2023.02.017.

\*Corresponding author



Copyright © The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

studied the establishment of marketing strategy in the development of competitiveness of enterprises in Ukraine. Nevertheless, their research was quite theoretical, without any real examples of the use of certain methods by companies. I. Kotelnikova (2022) paid more attention to the innovative component of enterprises in the context of increasing their competitiveness. The researcher described in sufficient detail the digital products that can be used for these purposes, but also did not give any practical examples. T. Omelchenko (2022) investigated the possibilities of developing Ukrainian companies in wartime conditions. However, the researcher examined a very small amount of statistical data to form final conclusions in this context. Now the study of the problems of further functioning of Ukrainian companies in such conditions is still relevant.

The role of the quality management system in ensuring the competitiveness of industrial enterprise products was investigated by I. Vlasenko (2021), who described in sufficient detail the reasons for the importance of using quality management techniques in enterprises, and also noted the interpretation of the concept of quality by other researchers. However, his paper also lacks practical context. A similar problem is present in the study by T. Lepeyko & A. Shcherbak (2018), where the authors proposed using scenario planning technology. I. Kryvonohova (2021) identified three main approaches to the process of developing a strategy for innovation and investment activity of a food enterprise, and also proposed her own approach to developing such a strategy. However, her research did not develop a methodology for rational organisation of innovation and investment activity. Thus, it is still important to investigate the practical component of the development of quality management in Ukrainian companies.

The purpose of this study was to provide recommendations on the future improvement of product quality improvement strategies in Ukraine and to describe quality management methods. By giving examples of their use in the world, the efficiency of local companies will increase.

## **MATERIALS AND METHODS**

As part of the study, tools for improving product quality were analysed through a systematic review. The evaluation of methods for improving product quality can be approached from different angles, since different types of their classification can be carried out. This study mentioned individual methodologies such as Lean Manufacturing (LM), Six Sigma (SS), Lean Six Sigma (L6S), Theory of Constraints (TOC), and Total Quality Management (TQM). Moreover, using the example of individual companies, such as Toyota, AT&T, Bank of America and some others, the practical possibilities of using these models (in particular, SS and TQM) were shown. All calculations were made in Microsoft Excel.

Other scientific methods were also used during the study. For example, the historical method allowed evaluating past data that characterised the development features of individual companies (used as examples to demonstrate

the functioning of selected methodologies), and these systems in general. In turn, the abstraction method made it possible to disregard the impact of individual factors on the process of improving product quality at enterprises if they were not significant enough. The forecasting method helped to make estimates of how a given industry can develop in the future based on known current and historical data. The analysis allowed conducting a qualitative and quantitative assessment of existing information that characterised the most common methods of improving product quality in the world. Using the modelling, a model of the functioning of the TQM system was constructed, and its image was performed using the graphical method. The method of deduction was also used, which identified the main problems in the context of improving the quality of products in Ukraine based on available information about the country's development. In addition, it was used to evaluate the general features of approaches to product quality management and describe how they were actually used in enterprises. The comparison was used to evaluate individual approaches to improving product quality to form an understanding of their strengths and weaknesses in comparison with each other. It also allowed assessing the differences in the implementation of approaches to improving product quality at different enterprises.

However, this scientific study had a certain number of limitations. Thus, the paper briefly presented LM, SS, TOC, and TQM, but no other methodologies were described. In addition, the assessment of these systems was based on international experience, and only this data was used to formulate advice for Ukrainian enterprises, but without using a significant amount of information on the implementation of these methods in Ukraine (including due to the lack of publicly available information). Analysis of the use of approaches based on data from foreign enterprises was also limited since they also do not provide complete and open results of their implementation.

## **RESULTS AND DISCUSSION**

Methods for achieving the desired product quality can be divided into three groups: technical, organisational, and economic and social. Technical measures include the use of scientific and technological achievements in product design, compliance with technological discipline, product certification, and improvement of individual quality indicators. Organisational measures provide for the modernisation of production and management methods, the implementation of self-control, and the development of direct business ties. Economic and social measures cover forecasting, pricing, personnel motivation, and adaptation of personnel policy to market conditions. All this, especially in symbiosis, leads to improved product quality and increased profits, mainly due to higher prices for improved products. Although its prime cost may increase in such conditions, however, an increase in the price of products and demand for them in such conditions allows increasing the company's revenues.

In general, there are quite a significant number of methodologies that allow improving the quality of manufactured products. One of them is LM, which is based on reducing the time from placing a customer to receiving a payment to reduce costs. The method identifies seven areas of loss, including excessive movement, frequent and unnecessary transportation, excessive inventory, waiting, unnecessary processing, excessive production, and defects. Manufacturing companies often face problems such as inefficient organisation of work, resource waste, and improper management of employee teams, which aims to solve LM by increasing team efficiency and improving the process of achieving goals. To implement LM, companies begin by organising employee training on the 5S concept, covering such stages as selecting unnecessary items, better organisation of work and systematic activities, maintaining cleanliness and cleaning, cleanliness of the workplace and the habit of self-discipline of employees. All of these 5 components are designed to increase efficiency, maintain order, and create healthy habits at work (Tissir *et al.*, 2022; Rathi *et al.*, 2023).

Another methodology is SS. It aims to achieve a high level of quality corresponding to Six Sigma, where the number of defective products per million is extremely low. The stages of the methodology include: formulation of project goals and quality improvement plans through the use of individual tools such as “Voice of the Customer”, Quality Function Deployment (QFD) and comparative analysis; implementation of a business process measurement system (using tools such as sequence graph and flow chart data analysis); conducting business process analysis to identify methods to bridge the gap between the current sigma level and the target value (using tools such as cause-and-effect diagrams, brainstorming and detailed process mapping); optimising business processes to reduce costs and minimising errors (using project management tools, kinship diagrams, and tree diagrams); monitoring business processes after implementing improvements (using reporting systems). Thus, this methodology includes a fairly impressive list of tools that can be used by companies to improve their own competitiveness. Both methodologies can be used simultaneously, in which case the L6S methodology is created, which allows performing the functions of both approaches simultaneously even more effectively.

Theory of Constraints, or TOC, developed by Dr. Elia Goldratt in the 1980s is also a widely used concept in

organisational management. The concept focuses on identifying and managing a key constraint in the organisational system that determines the overall effectiveness of the organisation. The main key points of it are: increasing the impact (emphasis on achieving the greatest effect by increasing the impact on a small number of factors of the system, and not on solving several problem areas at the same time) and limiting (not only factors that limit the development of the system, but also serve to raise the system to a new level, provided that it is effectively controlled). In general, the author of this theory noted several types of restrictions. One of them is the power limit, that is, the lack of resources needed to create an additional product per unit of time. The other was highlighted as limiting the volume of the market, namely, not using market opportunities. The latter limitation is related to time, i.e., the inability to respond quickly to market needs, which leads to problems with execution and increasing business capacity. Thus, the company’s goal in this case is to find system restrictions and then make a decision about their solution.

The latest concept considered in this study is TQM, a management approach aimed at achieving long-term success through customer satisfaction. Under this model, all company members should participate in improving processes, products, services, and organisational culture. The main components of this concept are: customer orientation (the product created by the company should be such that the client would like first of all, and it is the customer who evaluates its quality); full involvement of employees (all employees should actively participate in the work on achieving common goals); process orientation (emphasis on process thinking, where processes are defined, controlled and constantly improved to transform input data into the desired results); system integration (the need for interconnectedness of horizontal processes in the organisation); strategic and systematic approach to the development of the company; continuous improvement of internal processes; decision-making based only on facts effective communication both during meetings and in everyday life. This system aims to ensure the long-term success of the company’s development by improving its main internal processes, in particular, in the field of production, and improving the principles of corporate culture. The essence of the TQM system can be described in Figure 1, which shows the basic principles of this model.

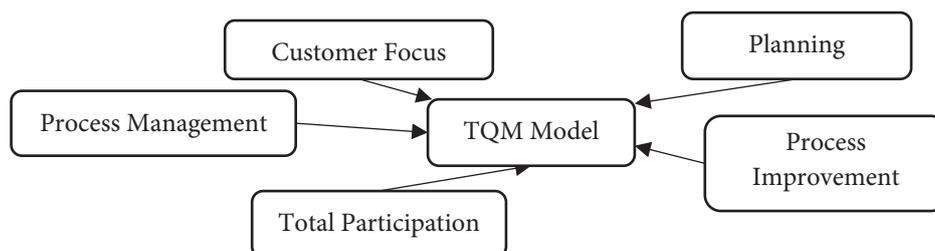


Figure 1. TQM principles

Source: compiled by the author

The TQM model will be incomplete without the components shown in Figure 1, because they are the focus of managers' attention when implementing it in a company. In fact, they have already been described above: attention should be paid to customers to assess the quality of products; special attention should be paid to the planning of the company's work and the process of its functioning; in addition, it is important to ensure full return from employees for the project, especially from the management team.

It is also worth giving examples of the use of these systems in individual companies. Thus, one of the examples of using TQM is the Toyota case study. As already noted, the basis for the functioning of TQM in the company is that the company's management is committed to it at all levels, for which work is being done to promote the growth of workers' motivations, expand their business opportunities, etc. In this regard, the company expanded the responsibility of management for the efficiency of doing business, analysed how consumers used its products for continuous improvement, focused on minimising the negative impact of bureaucratisation of internal procedures on the functioning of the company. Toyota constantly checks the quality of products, equipment, tools and resources that ensure the production process. A decentralised decision-making system is also widespread. The existing job management system prioritises customer satisfaction through loyal and efficient product delivery at a reasonable price. The company's goal is to achieve such indicators as quality, speed, flexibility, reliability and cost, which is now quite effective for the company, including due to many years of experience in this business.

However, the introduction of TQM in Toyota was not without problems. Managers and quality managers face difficulties, including a lack of certain types of resources, in particular, financial and human resources, since the use of such a system requires not only qualified personnel, but also significant funds. In Toyota's case, problems with TQM implementation also include difficulties in developing new products, reliability issues, a mysterious culture, a dysfunctional organisational structure that hinders communication, and potential gaps in the production system due to inadequate training of internal personnel and interaction with individual partners, particularly suppliers. Lack of leadership at the top management level also sometimes creates problems in the implementation of TQM: the development of organisational structures and systems that affect quality requires responsibility from senior management and managers (Implementation of Total..., 2023).

An example of using L6S is AT&T, a major global telecommunications company. With a huge customer base and global presence, AT&T is a leading provider of broadband, long-distance, and local voice services. The company uses various components included in the SS methodology, including training programmes, online and offline webinars (Parkhi, 2019). Another example is Bank of America. In banks, many processes are prone to inefficiency, from outdated software that causes delays, to complex

documentation procedures that lead to errors and loss of time. Even seemingly routine tasks like sending checks, coordinating managers, opening accounts, and collecting debts involve complex processes that can be improved. The adoption of SS by Bank of America in 2001 demonstrated its commitment to comprehensive improvement of organisational processes. The initiative has produced significant results, including a USD 1.3 million reduction in the cost of moving new recruits, a USD 3.6 million improvement in credit card sales, USD 6.6 million in savings from reduced identity theft, nearly USD 1 million in more efficient federal tax returns, and a 70% reduction in bank robberies. Barbara Desoer, appointed chief executive of global technology from 2014 to 2019, emphasised that the company listens to customer feedback, based on which they try to improve the efficiency of doing business in accordance with their expectations. The bank's IT staff under her leadership focused on improving the efficiency of technologies, simplifying the opening of online accounts, optimising the acquisition processes of other financial institutions, and implementing the banking business of the 21<sup>st</sup> century with the principles of L6S (Making Bank: How..., 2018; Mousavi Isfahani *et al.*, 2019).

The L6S methodology was also used by Starbucks to increase the company's revenue and customer satisfaction. Its implementation included preliminary testing of the methodology, development of an implementation strategy, interaction with management and employees, data collection and analysis, work on solving problems that have arisen, and long work on achieving customer satisfaction. Starbucks, introduced in the early 2000s, was initially criticised for changes such as the introduction of a new espresso machine and steaming milk, which replaced manual frying. Despite initial difficulties and falling sales, the lean introduction of SS eventually led to significant success: in 40 years, Starbucks has grown from a separate store in Seattle to the largest coffee chain in the world. This has led the company to become a "trendsetter" in the coffee industry, using innovative strategies to attract customers and using sustainable business practices (Starbucks success story..., 2023). Separate strategy methods were also used in Coca-Cola (Sadraoui *et al.*, 2010). In particular, the company has reduced its electricity consumption and improved its own production lines within SS, which has significantly improved the quality of internal processes.

Based on the above information, some recommendations can be made for Ukrainian companies in terms of implementing strategies to improve product quality. Thus, they should implement one of the several most common methods of improving product quality, namely LM, SS, L6S, TQM, or TOC, considering the experience of foreign companies that have been able to achieve significant success in improving the efficiency of enterprises, namely, increasing sales, optimising costs, or changing the paradigm of the company's employees. However, before implementing it, managers should do a thorough research on which methodology will be optimal for their company at the moment,

considering the different situations, problems, and needs of their companies.

The study of product quality improvement policy in the context of the new technological revolution was carried out by F. Psarommatis *et al.* (2020). They noted that the implementation of a quality management system based on various philosophies allows achieving significant advantages over competitors. Among them, it is worth highlighting the reduction of production time, reduction of its prime cost, etc. In addition, the study showed the importance of having a quality higher education to better understand the functioning of such tools. This indicates the need to form a standardised education in the field of quality management. The study also described the importance of using various tools related to improving product quality. This is especially important in Ukraine, which is at war. Local enterprises are quite weakened in the international arena, which indicates the urgency of implementing such methods by local companies.

Research on the strategy for improving product quality in the supply chain was conducted by H. Wang (2020). The researcher emphasised the importance of the manufacturer's price-to-cost ratio as a key parameter in the strategy for improving the quality of the two-channel supply chain. It was emphasised that this ratio plays a crucial role in influencing quality improvement parameters. This effect is especially evident if the enterprise has a decentralised decision-making process. Models for improving product quality, considering quality investments in processing policies and distribution of supply chain profits, were investigated by A. Sofiana *et al.* (2019). The researchers described two quality improvement policies for the production process with inspection and processing, considering the distribution of profits in the supply chain. The first policy provided for recycling at the same manufacturing facility, while the second policy provided for additional processing equipment. Researchers stressed the importance of improving quality in the context of supply chains at the enterprise, in particular, in the context of interaction with suppliers. A system was also proposed in which part of the profits should be given to suppliers, who, in turn, should be required to contribute to improving the quality of service delivery on their part. The methods of improving product quality described by H. Wang (2020) and A. Sofiana *et al.* (2019), were not evaluated in this paper, since the studies conducted by these researchers are rather limited, as they propose the introduction of quality parameters only for certain indicators or situations. Using holistic product quality improvement strategies should bring benefits at a larger level. However, the author of this study agrees that using both approaches is justified and necessary for enterprises if managers see their implementation as an opportunity to get a net present value.

TQM in small and medium-sized enterprises was investigated by C.F. Obunike & A.A. Udu (2018) and O.N. Anifowose *et al.* (2022). The latter noted that TQM has a positive impact on both the speed of innovation and

the operational performance of small and medium-sized companies. Accelerated innovation, especially in processes and products, is emphasised as a key factor for improving operational efficiency. The researchers recommend that manufacturing companies actively integrate TQM practices, ensuring continuous improvement, employee empowerment, and a culture that also contributes to product quality. They also emphasise the importance of reengineering business processes to maintain competitiveness. This article also examined the impact of TQM on enterprises, not on small or medium-sized ones, but on the Toyota Corporation. Therefore, it is fair to assume that such a judgment is true for both small and medium-sized companies and market giants. Features of the implementation of this system were also investigated by A. Permana *et al.* (2021). The researchers emphasised that TQM is widely used around the world due to its focus on increasing customer satisfaction, improving the quality of products and services, and overall organisational excellence. Leadership commitment and employee engagement stand out as important factors for successful implementation, and the simplicity and ease of implementation make it a solid concept. However, the definition of standard measurement methods for quantifying the implementation of TQM for sustainable development remains relevant. As noted above, TQM is indeed very popular among companies in the world, as evidenced once again by the use of this technique by corporations such as Toyota.

The detailed essence of the SS approach was described by F. Tsung & K. Wang (2023). The authors have shown how the use of this system has led to a significant number of positive results, allowing for more efficient customer service and better internal work in terms of employee and management interaction. The role of the SS approach for cost management was investigated by Y. Ramakrishna & H.M. Alzoubi (2022). Researchers have shown the impact of this approach on the cost and quality of manufactured products, which is especially important for companies in the financial sector, given the increase in their costs due to the economic situation in the world. In this paper, it was noted that this method is one of the most popular among those that are used specifically to improve the quality of products, and therefore it is used in many companies, including AT&T, Bank of America, and others.

The effect of LM on healthcare professionals was studied by Z. Mahmoud *et al.* (2021). The researchers have shown that there is a positive relationship between the use of LM principles and the performance of healthcare professionals. In particular, this led to improved teamwork, communication, and job satisfaction, and identifying negative processes such as increased stress levels, workload, and dehumanisation. However, the researchers insist on a more critical attitude to the LM principles and their effectiveness, calling for new research on this topic. J.C. Prado-Prado *et al.* (2020) evaluated opportunities to improve competitiveness by implementing LM in healthcare systems. The study showed a significant improvement in the efficiency and effectiveness of working with patients due to the use

of this methodology. The researchers also emphasised the importance of focusing on processes, identifying waste in relationships between processes, and involving staff in task rescheduling. Setting key performance indicators to support compliance with LM principles also plays an important role. The importance of creating an internal climate of trust, simplifying processes and forming permanent teams at different stages of work was emphasised. Although the research conducted by the author did not provide examples of the functioning of the LM strategy, more attention was focused on L6S, which is a symbiosis of the two respective approaches. The use of L6S has also led to positive results, which may indicate that its use in the healthcare sector will also be effective.

## CONCLUSIONS

The study evaluated various methodologies to achieve the desired product quality and improve the overall efficiency of the organisation. The following systems were considered: LM, SS, TOC, and TQM. A brief description of each of them is also provided: LM aims to reduce time and costs by identifying areas of loss; SS aims at high quality standards; TOC focuses on managing key constraints in organisational systems to improve overall efficiency; TQM, emphasising long-term success through customer satisfaction, implies active participation of all members in process improvement and a strategic systematic approach to development. In addition, individual examples of the use of these systems by companies were shown, namely AT&T, Bank of America and Starbucks

(for SS), which showed successful results in reducing costs, improving sales and increasing customer satisfaction, and Toyota (for TQM), which significantly improved the efficiency of management processes in the company.

In general, the study makes it clear that there is a considerable variety of models for improving the efficiency of enterprise functioning and product quality. All of them have their own characteristics, and therefore, affect the work of the company in different ways. Thus, management representatives should conduct a qualitative assessment of their own enterprise and the environment to be able to choose the most effective methodology for them. In Ukraine, there are still few examples of using such systems. This suggests that there are still opportunities in the country to improve the efficiency of enterprises. Local managers should learn from the successful experience of global companies and actively use it on their own experience to achieve efficient and better results in the operation of enterprises. It is important for further research to find other methods of improving the efficiency of Ukrainian enterprises. In addition, it is important to continue to investigate the experience of foreign companies in this context to be able to get recommendations on the development of Ukrainian enterprises.

## ACKNOWLEDGEMENTS

None.

## CONFLICT OF INTEREST

None.

## REFERENCES

- [1] Anifowose, O.N., Ghasemi, M., & Olaleye, R.B. (2022). Total quality management and small and medium-sized enterprises' (SMEs) performance: Mediating role of innovation speed. *Sustainability*, 14(14), 8719. doi: 10.3390/su14148719.
- [2] Implementation of Total Quality Management (TQM): Toyota case study. (2023). Retrieved from <https://ivypana.com/essays/total-quality-management-tqm-implementation-toyota/>.
- [3] Kotelnikova, I. (2022). Increasing the competitiveness of enterprises under the conditions of digitalization. *Innovation and Sustainability*, 4, 101-108. doi: 10.31649/ins.2022.4.101.108.
- [4] Kryvonohova, I. (2021). Conceptual approaches to the development of a strategy for innovation and investment activity in a food enterprise. *Scientific Bulletin of Mukachevo State University. Series "Economics"*, 8(3), 60-66. doi: 10.52566/msu-econ.8(3).2021.60-66.
- [5] Lepeyko, T., & Shcherbak, A. (2018). Determining factors to ensure the effective formation of the information process in the industrial enterprise management. *Development Management*, 16(4), 88-97. doi: 10.21511/dm.4(4).2018.08.
- [6] Mahmoud, Z., Angelé-Halgand, N., Churruca, K., Ellis, L.A., & Braithwaite, J. (2021). The impact of lean management on frontline healthcare professionals: A scoping review of the literature. *BMC Health Services Research*, 21, 383. doi: 10.1186/s12913-021-06344-0.
- [7] Making bank: How financial institutions profit from lean Six Sigma. (2018). Retrieved from <https://www.sixsigmadaily.com/making-bank-how-financial-institutions-profit-from-lean-six-sigma/>.
- [8] Mousavi Isfahani, H., Tourani, S., & Seyedin, H. (2019). Lean management approach in hospitals: A systematic review. *International Journal of Lean Six Sigma*, 10(1), 161-188. doi: 10.1108/IJLSS-05-2017-0051.
- [9] Obunike, C.F., & Udu, A.A. (2018). Technological innovativeness and growth: A study of small scale manufacturing firms in Lagos State. *Economics of Development*, 17(4), 39-53. doi: 10.21511/ed.17(4).2018.05.
- [10] Omelchenko, T. (2022). Competitiveness of Ukrainian enterprises in the conditions of war. *Economics and Organization of Management*, 3(47), 94-103. doi: 10.31558/2307-2318.2022.3.10.
- [11] Parkhi, S.S. (2019). Lean management practices in healthcare sector: A literature review. *Benchmarking: An International Journal*, 26(4), 1275-1289. doi: 10.1108/BIJ-06-2018-0166.

- [12] Permana, A., Purba, H.H., & Rizkiyah, N.D. (2021). A systematic literature review of Total Quality Management (TQM) implementation in the organization. *International Journal of Production Management and Engineering*, 9(1), 25-36. doi: [10.4995/ijpme.2021.13765](https://doi.org/10.4995/ijpme.2021.13765).
- [13] Prado-Prado, J.C., García-Arca, J., Fernández-González, A.J., & Mosteiro-Añón, M. (2020). Increasing competitiveness through the implementation of Lean Management in healthcare. *International Journal of Environmental Research and Public Health*, 17(14), 4981. doi: [10.3390/ijerph17144981](https://doi.org/10.3390/ijerph17144981).
- [14] Pronko, L., & Tokar, K. (2022). Marketing strategy in the formation of competitiveness of the enterprise. *Efektivna Ekonomika*, 4. doi: [10.32702/2307-2105-2022.4.73](https://doi.org/10.32702/2307-2105-2022.4.73).
- [15] Psarommatis, F., Prouvost, S., May, G., & Kiritsis, D. (2020). Product quality improvement policies in Industry 4.0: Characteristics, enabling factors, barriers, and evolution toward zero defect manufacturing. *Frontiers in Computer Science*, 2, 26. doi: [10.3389/fcomp.2020.00026](https://doi.org/10.3389/fcomp.2020.00026).
- [16] Ramakrishna, Y., & Alzoubi, H.M. (2022). Empirical investigation of mediating role of Six Sigma approach in rationalizing the COQ in service organizations. *Operations and Supply Chain Management*, 15(1), 122-135. Retrieved from <https://research.skylineuniversity.ac.ae/id/eprint/210/1/81.pdf>.
- [17] Rathi, R., Kaswan, M.S., Antony, J., Cross, J., Garza-Reyes, J.A., & Furterer, S.L. (2023). Success factors for the adoption of green lean Six Sigma in healthcare facility: An ISM-MICMAC study. *International Journal of Lean Six Sigma*, 14(4), 864-897. doi: [10.1108/IJLSS-02-2022-0042](https://doi.org/10.1108/IJLSS-02-2022-0042).
- [18] Sadraoui, T., Afef, A., & Fayza, J. (2010). Six Sigma: A new practice for reducing water consumption within Coca Cola industry. *International Journal of Six Sigma and Competitive Advantage*, 6(1/2), 53-76. doi: [10.1504/IJSSCA.2010.034856](https://doi.org/10.1504/IJSSCA.2010.034856).
- [19] Sofiana, A., Rosyidi, C.N., & Pujiyanto, E. (2019). Product quality improvement model considering quality investment in rework policies and supply chain profit sharing. *Journal of Industrial Engineering International*, 15, 637-649. doi: [10.1007/s40092-019-0309-7](https://doi.org/10.1007/s40092-019-0309-7).
- [20] Starbucks success story: The Six Sigma process in 2023. (2023). Retrieved from <https://www.henryharvin.com/blog/starbucks-success-box-the-six-sigma-process/>.
- [21] Tissir, S., Cherrafi, A., Chiarini, A., Elfezazi, S., & Bag, S. (2022). Lean Six Sigma and Industry 4.0 combination: Scoping review and perspectives. *Total Quality Management & Business Excellence*, 34(3-4), 261-290. doi: [10.1080/14783363.2022.2043740](https://doi.org/10.1080/14783363.2022.2043740).
- [22] Tsung, F., & Wang, K. (2023). Six Sigma. In *Springer handbook of engineering statistics* (pp. 239-259). London: Springer. doi: [10.1007/978-1-4471-7503-2\\_13](https://doi.org/10.1007/978-1-4471-7503-2_13).
- [23] Vlasenko, I. (2021). The role of quality management system in ensuring competitiveness of industrial enterprise products. *Economics and Management Organization*, 3(43), 194-203. doi: [10.31558/2307-2318.2021.3.19](https://doi.org/10.31558/2307-2318.2021.3.19).
- [24] Wang, H. (2020). Research on product quality improvement strategy of supply chain considering consumers' double preference. In *Proceedings of the international conference on education, economics and information management (ICEEIM 2019) "Advances in social science, education and humanities research"* (pp. 163-169). London: Atlantis Press. doi: [10.2991/assehr.k.200401.039](https://doi.org/10.2991/assehr.k.200401.039).

**Сергій Віталійович Синечко**

Аспірант

Європейський університет

02000, бульв. Академіка Вернадського, 16В, м. Київ, Україна

<https://orcid.org/0009-0001-0602-4068>

## **Формування стратегії підвищення якості продукції**

**Анотація.** В сучасних конкурентних умовах якість продукції стає одним із основних індикаторів, на який звертають увагу користувачі при виборі товару. Таким чином, актуальним залишається аналізувати процес формування стратегії якісного виробництва. Метою проведення даного дослідження є аналіз методів формування стратегії підвищення якості продукції на базі прикладів окремих компаній. Основними методами дослідження, що були використані в роботі, стали: аналіз, прогнозування, історичний та інші. В рамках дослідження були розглянуті окремі методи управління якістю продукції, а саме: Lean Management, Six Sigma, Theory of Constraints і Total Quality Management. Було описано їхні особливості, мета використання, а також етапи впровадження. Зокрема було показано, що основною ціллю Lean Management є скорочення часу та витрат для забезпечення високих стандартів якості, тоді як Total Quality Management більше націлений на дослідження вподобань клієнтів та оптимізацію внутрішніх мотивацій працівників компанії. Таким чином, було зроблено висновки про те, що кожен із методів може бути використаний різними компаніями в різний час та приносити різні показники ефективності. Це говорить про актуальність та необхідність проведення окремих досліджень менеджерами компанії для вибору підходу, що буде найбільш ефективним для них. Крім того, було проведено оцінку впровадження даних методів на окремих підприємствах, а також описані проблеми та переваги, що були отримані від них. Проведене дослідження приносить нові знання в теорію маркетингу, а його висновки можуть бути використані компаніями на практиці, наприклад під час процесу створення власної конкурентної стратегії на ринку

**Ключові слова:** підприємництво; маркетинг; економіка України; конкуренція; продажі

UDC 338.4

DOI: 10.56318/eem2023.02.025

**Novanda**

Student

Gunadarma University

16424, 100 Jl. Margonda Raya, Depok, Indonesia

<https://orcid.org/0009-0007-6924-3894>**Henny Medyawati\***

PhD in Economics, Associate Professor

Gunadarma University

16424, 100 Jl. Margonda Raya, Depok, Indonesia

<https://orcid.org/0000-0001-7119-1711>

## Determinant of Shopee Xpress consumer satisfaction in Jakarta Greater Area

**Abstract.** Logistics plays an important role in facilitating corporate trade by providing the necessary services to deliver goods from producers to consumers. Therefore, it is important to consider consumer attitudes and behaviours related to consumer satisfaction with the services provided by logistics companies. The research aims to analyse the effect of service quality, price perception, and promotion on consumer satisfaction of Shopee Xpress consumers and to determine which variables are the most dominant. The analysis method used in this research was partial least square. The test stages conducted were convergent validity test discriminant validity, composite reliability, Cronbach's alpha, R-square, F-square, predictive relevance, goodness of fit, and path coefficient. The data used in this research were obtained from questionnaire instruments and valid data of 120 respondents were collected. The sampling method in this research is nonprobability sampling with the technique of purposive sampling. The results showed that the variables of service quality and promotion influenced consumer satisfaction, but the variable of price perception did not influence consumer satisfaction and the most dominant variable on consumer satisfaction is the promotion variable. The variables of service quality, price perception, and promotion affected Shopee Xpress consumers around the Jakarta Greater Area simultaneously. The research results prove that the three variables studied determine consumer satisfaction with users of the Shopee Xpress delivery service in the Greater Jakarta area. This research is focused on companies where more people will choose to use the services provided, supported by promotions and the perception of adequate prices, and the results provide practical recommendations for improving the quality of service of these same companies in the future

**Keywords:** logistic services; promotion; marketing; service quality

### INTRODUCTION

As of 2023, there are many services based on applications, one of which is freight forwarding or delivery services. The large number of people shopping for goods determines freight forwarding or goods delivery as increasingly

necessary for today's society, especially for people who undertake the buying and selling process remotely using online media. This causes more freight forwarding services to appear in Indonesia. One of the competing freight

---

#### Article's History:

Received: 07.07.2023

Revised: 06.10.2023

Accepted: 16.12.2023

#### Suggested Citation:

Novanda, & Medyawati, H. (2023). Determinant of Shopee Xpress consumer satisfaction in Jakarta Greater Area. *Economics, Entrepreneurship, Management*, 10(2), 25-34. doi: 10.56318/eem2023.02.025.

\*Corresponding author



Copyright © The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

## LITERATURE REVIEW

forwarding service companies is Shopee Xpress in the domestic region of Indonesia.

S. Ahmed *et al.* (2023) noted that both perceived service quality and fairness in pricing exert a direct and substantial impact on consumer contentment. Their research reveals a significant correlation between how pricing fairness is perceived and both consumer delight and loyalty. S.L. Ng *et al.* (2022) determined that the quality of systems and e-service positively contributes to the satisfaction derived from using retail apps, and this satisfaction, in turn, has both direct and indirect positive effects on the intention to continue using these apps. The level of pricing, conversely, negatively influences user satisfaction with retail apps. While the pricing level does not directly affect the intention to continue using retail apps, it does have an indirect influence through user satisfaction. C. Jannah & L. Alhazami (2022) examined the effect of service quality, price perception and product variety on consumer satisfaction. The research object was a CV. Sumber Garuda Mas. A sample of one hundred respondents was used in this research. The respondent-survey method used was a questionnaire. The data analysis method was employed on multiple linear regression analysis, coefficient of determination, classical assumption test (F test), and partial test (T-test). The results showed that there was a significant relationship between studying factors. A.H. Prasetyo *et al.* (2022) conducted a multiple linear regression to analyse the effect of service quality, price perception, and communication ability on consumer satisfaction. According to the research findings, service, price, and communication have a significant effect both simultaneously and partially on consumer purchasing decisions. The variable that has a dominant effect on consumer satisfaction is the communication variable.

N. Bimaria *et al.* (2020) investigated the impact of service quality, price perception, and product quality on consumer satisfaction at Sendy's Swalayan Palangka Raya. They collected data using questionnaires from one hundred respondents. The research results determined that service quality, price perception, and product quality individually exert a significant and partial influence on consumer satisfaction. S.-Y. Tzeng *et al.* (2021) discovered that information quality, product quality, and savings contribute positively to consumer satisfaction during online shopping holidays, while product returns have a negative impact. Enhancing after-sale services can facilitate the product return process, leading to an improvement in consumer satisfaction.

There is still a research gap that encourages this research to be carried out again. The purpose of this study was to analyse consumer behaviour related to services delivered by logistics company Shopee Xpress and at the same time analyse what factors influence what the company has provided. The benefits and contributions of this research are to enrich research models that analyse consumer satisfaction with the performance of logistics companies and provide recommendations for companies regarding what factors still need to be considered to satisfy consumers.

Various theories related to the variables in this research have been presented by many scientists. According to B. Alma (2016), promotion serves as a means of communication aimed at conveying information to prospective consumers regarding a product's ability to fulfil their needs and desires. This, in turn, encourages these potential consumers to make purchases or avail themselves of the product or service. Hence, promotion holds immense significance for a company when it comes to marketing the products or services it offers. The concept of marketing mix, as highlighted by R. Hurriyati (2018), can be understood as comprising internal elements of utmost importance in shaping a company's marketing strategy.

As outlined by P. Kotler & G. Armstrong (2019), the components of marketing include the following: (1) Product management involves planning and developing the appropriate products or services for marketing, which may include modifying existing offerings through additions and other actions that impact various products or services; (2) Price entails the company's management system for determining the initial pricing of products or services and formulating strategies related to discounts, shipping costs, and various other variables; (3) Place involves the selection and management of distribution channels used to deliver products or services, as well as serving the target market. It also encompasses the development of distribution systems for physically transporting products to customers and businesses; (4) Promotion refers to the efforts employed to inform the consumers about the company's new products or services through means such as advertising, personal selling, sales promotion, and publicity.

The issues of consumer satisfaction and loyalty continually attract the attention of researchers. In a study conducted by S. Santi & A. Putra (2021), an investigation was carried out to assess the impact of price perception, promotion, service quality, and the ambience of a café on consumer satisfaction. The research focused on Cafe Bumi customers during the period from October to December 2020, with a total population of 2,250 consumers. The study obtained a sample size of 96 individuals. The research results demonstrated that price perception, promotion, service quality, and the café's atmosphere all jointly exerted a positive and statistically significant influence on consumer satisfaction.

In their study, conducted at UD. Wipra Print Karangasem, N. Yanti & I. Puja (2021) investigated the impact of service quality, pricing, and promotional activities on consumer satisfaction. The research sample comprised one hundred respondents. The findings can be summarized as follows: service quality, price, and promotion all demonstrated a positive and statistically significant influence on consumer satisfaction. This implies that as consumers perceive higher levels of quality in service, more favourable pricing, and effective promotional efforts, their satisfaction with Percetakan UD. Wipra Print Karangasem increases accordingly.

I. Diputra & N. Yasa (2021) determined that consumer loyalty significantly affects client dependability. They led an assessment of the impact of item quality, brand picture, and brand trust on both consumer loyalty and client faithfulness. The examination included 185 respondents from Denpasar City, who bought and utilized Samsung cell phones. Their study employed a purposive sampling method for member choice. The survey information was exposed to explicitly Structural Equation Modelling (SEM). The results of this study demonstrate that item quality has a positive and huge effect on brand picture, brand trust, and consumer loyalty. Moreover, brand picture and brand trust likewise exhibit a positive and tremendous impact on consumer satisfaction.

Y. Suhardi *et al.* (2020) selected product diversity as one of the variables in their research. Their study unveiled the impact of product diversity, price perceptions, and service quality on consumers' purchasing decisions. R.S.D. Saputri (2019) established that both service quality and price affect customer loyalty. A.D. Lestari & I. Hidayat (2019) also investigated the impact of service quality, price, and trust on consumer satisfaction. Their examination analysed clients of PT. Worldwide Fly Express (J&T) at the Jagir Wonokromo branch in Surabaya who had made buys and utilized cargo and reported conveyance benefits over multiple times. The discoveries uncovered that quality and trust meaningfully affected consumer loyalty. S. Subaebasni *et al.* (2019) investigated the effect of brand image, service quality, and price on consumer loyalty. The sample comprised 171 respondents, and structural equation models were employed for data analysis. The results of the analysis indicated that individually, brand image, service quality, and price all had a positive and significant impact on customer loyalty. Moreover, when thought about together, every one of the free factors displayed a positive and huge effect.

## MATERIALS AND METHODS

The subjects in this research are consumers who have used and still use freight forwarding services through Shopee Xpress, are at least 17 years old and domiciled in the Jakarta Greater area. The type of data used in this research was primary information using a quantitative approach, obtained through the distribution of online questionnaires using Google Forms through social media such as WhatsApp and Instagram. The questionnaire clearly states that the data and information submitted are used for research purposes only and are confidential. In this research, due to the unknown population size, the sampling formula used was Cochran, according to A. Sugiyono (2018) with the following formula:

$$n = \frac{Z^2 pq}{e^2}, \quad (1)$$

$$n = \frac{(1.96)^2(0.5)(0.5)}{(0.1)^2} = 96.04, \quad (2)$$

where  $n$  – number of samples required;  $Z$  – the confidence level is 95%, then the  $Z$ -value is 1.96;  $p$  – correct chance 50%;  $q$  – 50% chance of being wrong;  $e$  – Sampling error 10%.

So, based on the formula, a sample of 96.04 people was obtained. The instruments in the questionnaire were prepared in the form of statements using the Likert scale method with 5 alternative answers related to the 4 variables being researched. With a scale of Likert, the variables measured are translated into variable indicators. Based on the explanation above, the Likert scale can be seen as follows, Strongly Agree (Score 5), Agree (Score 4), Neutral (Score 3), Disagree (Score 2), Strongly Disagree (Score 1). In this research, respondents must choose one of the five alternative answers available, then the values obtained will be summed and the amount becomes the total value. The data obtained would be calculated and processed using the SmartPLS 4.0 data processing application using the Bootstrapping method which presents a value of P-value.

A partial least squares (PLS) processing method was employed. PLS carried out model measurements together with validity and reliability checks, and structural model testing (hypothesis testing with predictive models) was utilized for causality checks. The relationship between each block of items and its latent variable is shown by the outer model, also known as the outer relation or measurement model. A model's validity and reliability tests are measured using an outer model. Convergent validity, according to I. Ghazali (2016), gauges the strength of the association between constructs and latent variables. The loading factor for each construct indicator reveals the convergent validity test. An optimum loading factor value allows the indicator to accurately measure the constructed value, which is  $>0.7$ . However, for empirical study, a loading factor value of  $>0.5$  to 0.6 is regarded as adequate.

The measuring scale for each variable was determined by the operational definition of variables. Service quality (X1), price perception (X2), promotion (X3), and consumer satisfaction (Y) were the four variables considered in this study. To determine the bottom bound of the construct dependability value, Cronbach's alpha was applied. If both the composite reliability and Cronbach's alpha values are more than 0.7, a variable is considered reliable. To determine the relevance of the dependent construct in the structural model, the R-square, path coefficient values, or T-values for each path were used to evaluate the structural model.

Each endogenous latent variable's R-square ( $R^2$ ) value served as a measure of the structural model's capacity for prediction. The influence of some external latent variables on endogenous latent variables that have a significant impact can be explained by changes in the value of R-square. The values of  $R^2$  0.75, 0.50, and 0.25 in research on marketing issues, according to M. Sarstedt & J.-H. Cheah (2019), suggest respectively, high, moderate, and weak measures of influence. The better the prediction model of the research model under study, the higher the value of  $R^2$ . According to the F-square ( $F^2$ ) evaluation, each independent variable must be deemed significant to the dependent variable to be valued for inclusion in the model. If the  $F^2$  value of 0.02 is weak, the value of  $F^2$  0.15 indicates that it has a medium model and the value of  $F^2$  0.35 can be said to have a strong

model. The combination of validation and fitting functions with forecasts of manifest variables and estimation of construct parameters was represented by predictive relevance ( $Q^2$ ). The results ( $Q^2$ ) are 0.02 for the weak fit model, 0.25 for the moderate fit model, and 0.35 for the strong fit model in terms of predictive relevance validity. When  $Q^2$  is more than 0, the model is predictively relevant; when  $Q^2$  is less than 0, it is not.

## RESULTS AND DISCUSSION

Respondents who were consumers of Shopee Xpress delivery service in the Jakarta Greater Area were 69 men, which comprised 57.5%, and 51 women, comprising 42.5%. Respondents who were consumers of Shopee Xpress delivery service in the Jakarta Greater Area aged 17-25 years were 97 people with a percentage of 80.8%, respondents aged 26-35 years were 21 people with a percentage of 17.5%, and respondents aged >35 years were 2 people with a percentage of 1.7%. Hence, it can be concluded that most respondents who use Shopee Xpress delivery services are aged 17-25 years. Respondents domiciled in Jakarta were 81 people with a percentage of 67.5%, respondents domiciled in Bogor were 11 people with a percentage of 9.2%, respondents domiciled in Depok were 19 people with a percentage of 15.8%, respondents domiciled in Tangerang were 4 people with a percentage of 3.3%, and respondents domiciled in Bekasi were 5 people with a percentage of 4.2%.

The data comprises respondents who utilize Shopee Xpress delivery services in the Jabodetabek area, categorized by their occupations: students (70 individuals, accounting for 58.3% of the total); civil servants (1 person, constituting 0.8% of the respondents); private employees (34 individuals, representing 28.3% of the sample); entrepreneurs (3 individuals, making up 2.5% of the group); housewives (4 individuals, comprising 3.3% of the respondents); others (8 individuals, with a percentage of 6.7%). This can be concluded that most of the respondents who use Shopee Xpress delivery services are students because Shopee Xpress freight forwarding services have many promotions and discounts

such as free shipping that are preferred by students with the capacity of budget so students often use freight forwarding services through Shopee Xpress.

Respondents who are consumers of Shopee Xpress delivery services in the Greater Jakarta area with income/allowance of under Rp 500,000 per month are 15 people with a percentage of 12.5%, respondents with income/allowance of Rp 500,001 – Rp 1,000,000 per month are 20 people with a percentage of 16.7%, respondents with income/allowance of Rp 1,000,001 – Rp 1,500,001 per month are 16 people with a percentage of 13.3%, respondents with income/allowance of Rp 1,500,001 – Rp 2,000,000 per month are 9 people with a percentage of 7.5%, respondents with income/allowance of Rp 2,000,001 – Rp 5,000,000 per month are 37 people with a percentage of 30.8%, and respondents with income/allowance of over Rp 5,000,000 per month are 23 people with a percentage of 19.2%.

The respondents' usage of Shopee Xpress can be categorized as follows:

- less than 3 months – 31 individuals, accounting for 25.8%;
- 3-7 months – 25 individuals, representing 20.8%.
- 8-12 months – 14 individuals, making up 11.7%.
- more than 12 months – 50 individuals, with a percentage of 41.7%.

Respondents with the use intensity of 1-3 times a month were 68 people with a percentage of 56.7%, respondents with the use intensity of 4-5 times a month were 36 people with a percentage of 30%, respondents with the use intensity of more than five times a month were 16 people with a percentage of 13.3%. This can be concluded that most respondents use a lot of Shopee Xpress delivery services with an intensity of use as much as 1-3 times a month because the majority of respondents have an income of Rp 2,000,001 – Rp 5,000,000 per month where the money is divided for daily living needs and also other needs for their interests. Table 1 presents the results of data tests of service quality, price perception, promotion, and consumer satisfaction with the convergent validity value (outer loading) obtained.

**Table 1.** Convergent validity value (outer loading)

Variable	Indicator	Outer loading	Description
Service quality	X1.2 < X1	0.796	Valid
	X1.3 < X1	0.768	Valid
	X1.4 < X1	0.808	Valid
	X1.5 < X1	0.795	Valid
Price perception	X2.1 < X2	0.830	Valid
	X2.2 < X2	0.879	Valid
	X2.3 < X2	0.802	Valid
	X2.4 < X2	0.837	Valid
Promotion	X3.1 < X3	0.749	Valid
	X3.2 < X3	0.717	Valid
	X3.3 < X3	0.717	Valid
	X3.4 < X3	0.827	Valid
	X3.5 < X3	0.817	Valid

Table 1. Continued

Variable	Indicator	Outer loading	Description
Consumer satisfaction	Y.1 ← Y	0.823	Valid
	Y.2 ← Y	0.818	Valid
	Y.3 ← Y	0.814	Valid
	Y.4 ← Y	0.842	Valid
	Y.5 ← Y	0.848	Valid
	Y.6 ← Y	0.704	Valid
	Y.7 ← Y	0.775	Valid

Source: authors' development

The conclusion can be drawn that all the indicators of the research variables, including service quality, price perception, promotion, and consumer satisfaction, are deemed valid, as they exhibit outer loading values exceeding 0.70.

The results of the data tests for service quality, price perception, promotion, and consumer satisfaction, along with their discriminant validity values (cross loading), can be referred in Table 2 for further examination.

Table 2. Discriminant validity values (cross loading)

Variable	Service quality	Price perception	Promotion	Consumer satisfaction	Average Variance Extracted (AVE)
Service quality					
X1.1	0.668	0.470	0.520	0.579	0.591
X1.2	0.796	0.678	0.586	0.585	
X1.3	0.768	0.630	0.570	0.643	
X1.4	0.808	0.606	0.563	0.604	
X1.5	0.795	0.583	0.546	0.562	
Price perception					
X2.1	0.691	0.830	0.620	0.629	0.701
X2.2	0.703	0.879	0.702	0.696	
X2.3	0.616	0.802	0.674	0.628	
X2.4	0.584	0.837	0.620	0.631	
Promotion					
X3.1	0.528	0.536	0.749	0.659	0.588
X3.2	0.494	0.605	0.717	0.610	
X3.3	0.562	0.578	0.717	0.646	
X3.4	0.543	0.606	0.827	0.703	
X3.5	0.655	0.672	0.817	0.688	
Consumer satisfaction					
Y.1	0.729	0.633	0.679	0.823	0.648
Y.2	0.589	0.636	0.698	0.818	
Y.3	0.554	0.601	0.663	0.814	
Y.4	0.643	0.630	0.719	0.842	
Y.5	0.605	0.636	0.731	0.848	
Y.6	0.615	0.611	0.641	0.704	
Y.7	0.630	0.602	0.725	0.775	

Source: authors' development

It can be deduced that all variables within this study exhibit adequate discriminant validity, as they surpass the threshold of >0.70. Moreover, if the cross-loading value surpasses >0.60, it is considered satisfactory. Additionally, all variables in this research boast an AVE (Average Variance

Extracted) value exceeding 0.50. For a research variable to be considered reliable, both the composite reliability and Cronbach's alpha should exceed >0.70. The values of composite reliability and Cronbach's alpha are available in Table 3. The results of the R-square test are provided in Table 4.

**Table 3.** Value of composite reliability and Cronbach's alpha

Variable	Composite reliability	Cronbach's alpha	Description
Service quality	0.878	0.825	Reliable
Price perception	0.904	0.858	Reliable
Promotion	0.877	0.823	Reliable
Consumer satisfaction	0.928	0.909	Reliable

Source: authors' development

**Table 4.** R-square value (R<sup>2</sup>)

Variable	R-square	R-square adjusted
Customer satisfaction	0.796	0.791

Source: authors' development

It can be concluded that both the R-square value and the adjusted R-square value exhibit a robust influence, with values of 0.796 and 0.791, respectively. This strength is evident as the R-square value of 0.75 signifies a substantial impact. The assessment of the importance of each independent variable about the dependent variable was determined using the F-square value. The

inclusion of an independent variable into the model was contingent upon its level of significance. A weak model is indicated by an F-square value of 0.02, while a medium model is characterized by an F-square value of 0.15. Conversely, an F-square value of 0.35 suggests a strong model. Detailed results of the F-square value test are available in Table 5.

**Table 5.** F-square value (F<sup>2</sup>)

Indicator	F-square	Description
Service quality → Consumer satisfaction	0.158	Medium
Price perception → Consumer satisfaction	0.017	Weak
Promotion → Consumer satisfaction	0.590	Strong

Source: authors' development

Table 5 shows that the value of F-square in the service quality variable on consumer satisfaction is 0.158. With such a value, it can be stated to have a moderate model because the value of the substant level is greater than 0.15. The price perception variable on consumer satisfaction is 0.017. It can be stated to have a weak model because the value of the substant level is smaller than 0.02, also in the promotion variable on consumer satisfaction

is 0.590. It can be stated to have a strong model because the value of the substant level is greater than 0.35. It can be concluded that the service quality variable of 0.158 is stated to have a moderate model, the price perception variable of 0.017 is stated to have a weak model, and the promotion variable of 0.590 is stated to have a strong model. The test results of predictive relevance (Q<sup>2</sup>) can be seen in Table 6.

**Table 6.** Predictive value relevance (Q<sup>2</sup>)

Variable	Q <sup>2</sup> predict	RMSE	MAE
Consumer satisfaction	0.787	0.483	0.367

Source: authors' development

Table 6 shows that the result of the value of predictive relevance (Q<sup>2</sup>) is 0.787, which means that the value of predictive relevance (Q<sup>2</sup>) is greater than 0, which means that it has predictive relevance, and the value has a strong model predictive relevance validity greater than 0.35. Thus, it can be concluded that the model in this research had a relevant predictive value and a strong predictive relevance validity of fit, where the research model could explain the existing information.

The goodness of fit test in this research was used to determine the compatibility in the data distribution of a research model and the test can be seen with the SRMR (Standardized Root Mean Squared Residual) value. The value of goodness of fit with an SRMR value of 0.066 means

that the fit model is good, as the SRMR value below 0.08 indicates that the fit model is categorized as such. The value of goodness of fit with an NFI (Normed Fit Index) value of 0.783 categorizes the fit model as strong due to a base value of NFI being 0.36, which is interpreted as a good model and is categorized as large or strong. It can be concluded that the value of goodness of fit with SRMR and NFI values are respectively categorized as good and strong. A structural model can be prepared consisting of several exogenous variables, namely service quality, price perception, and promotion of endogenous variables, namely consumer satisfaction (Fig. 1).

Hypothesis testing in this research used PLS analysis by looking at the path coefficient contained in Table 7.

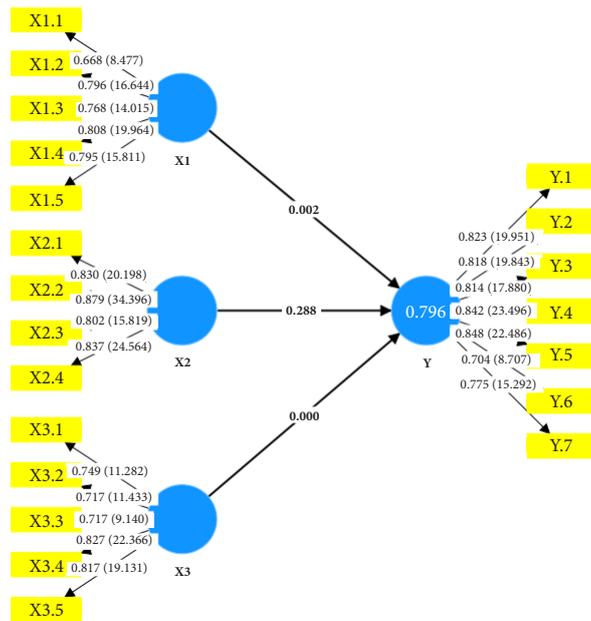


Figure 1. Statistical T-values and P-values structural model of the effect of exogenous variables on endogenous variables

Source: authors' development

Table 7. Path coefficient value

Variable	Path coefficients	Standard deviation (STDEV)	T-statistics	P-values	Description
Service quality → Consumer satisfaction	0.269	0.088	3.066	0.002	Significant
Price perception → Consumer satisfaction	0.107	0.101	1.063	0.288	Insignificant
Promotion → Consumer satisfaction	0.584	0.078	7.475	0.000	Significant

Source: authors' development

Service quality on consumer satisfaction. The path coefficient results reveal a T-statistical value of 3.066, which is greater than 1.96, at a significance level of  $\beta=0.05$ . Additionally, the P-value is 0.002, which is less than 0.05. These findings indicate that service quality has a direct and significant effect on consumer satisfaction. Moreover, the positive path coefficient value of 0.269 signifies a positive relationship between the service quality variable and consumer satisfaction.

Price perception on consumer satisfaction. The path coefficient results indicate a T-statistical value of 1.063, which is less than 1.96, at a significance level of  $\beta=0.05$ . Furthermore, the P-value is 0.288, which is greater than 0.05. These results suggest that price perception does not have a direct effect on consumer satisfaction. However, the positive path coefficient value of 0.107 implies a positive direction in the relationship between the price perception variable and consumer satisfaction.

Promotion on consumer satisfaction. The path coefficient findings show a T-statistic value of 7.475, which exceeds 1.96, at a significance level of  $\beta=0.05$ . Additionally, the P-value is 0.000, which is less than 0.05. These results indicate that promotion has a direct and significant impact on consumer satisfaction. Furthermore, the positive path coefficient value of 0.584 signifies a positive relationship between the promotion variable and consumer satisfaction.

The measurement results for the goodness of fit model, specifically the SRMR and NFI values, are indicative of a strong and satisfactory fit. Referring to Table 7, it's evident that the path coefficient values are significant ( $p<0.05$ ). Consequently, it can be concluded that the independent variables (exogenous variables) in this study, which encompass service quality, price perception, and promotion, collectively influence the dependent variable, namely consumer satisfaction. This determines that the variations observed in the consumer satisfaction variable can be elucidated by these three independent variables. The coefficient of determination, denoted as R-square and detailed in Table 5 with a value of 0.796, falls within the category of strong influence. This implies that approximately 79.6% of the variations in consumer satisfaction can be attributed to the three independent variables, namely service quality, price perception, and promotion. The remaining 20.4% of variability is explained by other independent variables that fall outside the scope of this research.

In light of the consequences of the exploration directed, Table 7 shows that help quality factors to some extent affect customer fulfilment. The service quality variable has a path coefficient value of 0.269 with a T-statistic value of 3.066 $>1.96$  and a probability value of P-values of 0.002 $<0.05$  ( $p<0.05$ ). This shows that the help quality variable affects buyer fulfilment. This implies that the nature

of administration has an impact on expanding purchaser fulfilment. This condition follows the aftereffects of the previous studies by C. Jannah & L. Alhazami (2022), which analysed comparable factors in this exploration, in particular the assistance quality to customer loyalty. This shows that the service quality variable has a positive and significant effect on consumer satisfaction and Shopee Xpress consumers in the Jakarta Greater Area are satisfied with the service quality provided by Shopee Xpress freight forwarding services. This outcome additionally upheld the hypothesis that help quality is the most elevated level of command over that level expected and customer loyalty (Tjiptono, 2012). Fulfilment will likewise rely upon item and administration quality. P. Kotler & K. Keller (2016) provided a definition from the American Culture for Quality, which states: "Quality is the entirety of highlights and attributes of an item or administration that bear on its capacity to fulfil expressed or suggested needs". Besides, they have reasoned that the nature of items and administrations, customer loyalty, and company benefit are unpredictably interconnected. In particular, they declare that a more significant level of value brings about a more significant level of consumer satisfaction. This highlights the meaning of conveying great items and administrations to accomplish positive client encounters and eventually upgrade an organization's productivity.

The variable of price perception does not exhibit a partial impact on consumer satisfaction. This is indicated by the path coefficient value of 0.107, with a T-statistic value of 1.063, which is less than 1.96, and a P-value of 0.288, which is greater than 0.05 ( $p > 0.05$ ). These findings suggest that, while there is a positive relationship between the price perception variable and consumer satisfaction, it lacks statistical significance. In essence, price perception does not have a significant influence on enhancing consumer satisfaction. This outcome diverges from the findings of prior research conducted by S. Santi & A. Putra (2021), which explored similar variables, specifically the impact of price perception on consumer satisfaction. In their research, they reported that price perception had a positive and significant effect on consumer satisfaction. However, the results of this study align with the conclusions of previous research conducted by A.D. Lestari & I. Hidayat (2019), which suggested that price had no significant influence on consumer satisfaction. These findings indicate that, based on the data obtained, not all respondents in the Jakarta Greater Area agreed with the pricing structure offered by Shopee Xpress.

Based on the results of data processing, it can be seen that the promotion variable has a partial effect on consumer satisfaction. The promotion variable has a path coefficient value of 0.584 with a T-statistic value of  $7.475 > 1.96$  and a probability value of P-values of  $0.000 < 0.05$  ( $p < 0.05$ ). This shows that the promotion variable has a positive and significant effect on consumer satisfaction. This means that promotion has the effect of increasing consumer satisfaction. This condition correlates with the results of previous research conducted by N. Sukarsih & G. Suputra (2021), stating that promotion affects consumer satisfaction. This

shows that Shopee Xpress consumers in the Greater Jakarta area agree that promotions carried out by Shopee Xpress in the form of advertisements in various mass media or social media and certain events, make it easier for consumers to get information about the shipping features/services.

The dominant variable is carried out to determine which independent variable has the most effect on the dependent variable (endogenous variable) by comparing other independent variables. Based on the results of the research conducted, Table 7 states that the most dominant and influential variable in this research is the promotion variable with the highest path coefficient value 0.584. This shows that the promotions carried out by Shopee Xpress are in the form of advertisements in various mass media or social media and at certain events, making it easier for consumers to get information about the shipping features/services owned by Shopee Xpress.

## CONCLUSIONS

It was observed that Service quality has a significant impact on Shopee Xpress consumer satisfaction in the Jakarta Greater Area. On the other hand, price perception was found to have no direct influence on Shopee Xpress consumer satisfaction in the Jakarta Greater Area. The promotion was found to exert a notable impact on Shopee Xpress consumer satisfaction in the Jakarta Greater Area. When considered together, service quality, price perception, and promotion collectively affect Shopee Xpress consumer satisfaction in the Jakarta Greater Area. Among these variables, promotion emerged as the most dominant and influential factor affecting Shopee Xpress consumer satisfaction in the Jakarta Greater Area. The results of this research proved that service quality, price perception, and promotion were variables that determine consumer satisfaction in Shopee Xpress delivery service in the Jakarta Greater Area. The research implications are as follows: Shopee Xpress in the Jakarta Greater Area has good service quality, and the promotions offered and provided by Shopee Xpress make people, especially in the Jakarta Greater Area, interested because of promos such as vouchers or discounts and free shipping so that consumers feel more satisfied. However, the price perception on Shopee Xpress has no effect on consumer satisfaction, due to the price of shipping options when there is no promotion or event offered by Shopee Xpress has an unaffordable price and is more expensive compared to other goods delivery services, so consumers feel less satisfied with the price perception given. In this research, it is expected that Shopee Xpress freight forwarding service companies located in the Jakarta Greater area to be able to maintain and improve the marketing strategies that have been implemented, such as improving the service quality, especially in physical evidence, empathy, responsiveness, reliability and assurance, so that it can further increase the value of consumer satisfaction and ultimately become a service that is still demanded by consumers. It is hoped that further research can add other variables such as brand image to make the research better and more complete.

**ACKNOWLEDGEMENTS**

None.

**CONFLICT OF INTEREST**

None.

**REFERENCES**

- [1] Ahmed, S., Al Asheq, A., Ahmed, E., Chowdhury, U.Y., Sufi, T., & Mostofa, M.G. (2023). The intricate relationships of consumers' loyalty and their perceptions of service quality, price and satisfaction in restaurant service. *The TQM Journal*, 35(2), 519-539. doi: 10.1108/TQM-06-2021-0158.
- [2] Alma, B. (2016). *Marketing management and service marketing*. Bandung: Alfabeta.
- [3] Bimaria, N.P.P.R., Kulu, M.P., & Peridawaty, P. (2020). The influence of service quality, price perceptions, and product quality on customer satisfaction at Sendy's Supermarkets Palangka Raya. *Journal of Science and Organizational Management*, 1(3), 181-191. Retrieved from <https://e-journal.upr.ac.id/index.php/jmsso/article/view/2759/2364>.
- [4] Diputra, I.G.N.A.W.M., & Yasa, N.N. (2021). The influence of product quality, brand image, brand trust on customer satisfaction and loyalty. *American International Journal of Business Management (AIJBM)*, 4(1), 25-34. Retrieved from <https://www.aijbm.com/wp-content/uploads/2021/01/E412534.pdf>.
- [5] Ghozali, I. (2016). *Concepts, techniques, and applications using the SMARTPLS 3.0 Program*. Semarang: Badan Penerbit Universitas Diponegoro.
- [6] Hurriyati, R. (2018). *Marketing mix and consumer loyalty* (4th Ed.). Bandung: Alfabeta.
- [7] Jannah, C., & Alhazami, L. (2022). The influence of service quality, price perception, taste and product variety on consumer satisfaction CV. Sumber Garuda Mas. *Research Journal of the Economics Clump*, 1(2), 29-45. doi: 10.55606/jurrie.v1i2.361.
- [8] Kotler, P., & Armstrong, G. (2019). *Principles of marketing*. Jakarta: Erlangga.
- [9] Kotler, P., & Keller, K.L. (2016). *Marketing management*. Boston: Pearson Education Limited.
- [10] Lestari, A.D., & Hidayat, I. (2019). The effect of service quality, price, and trust on customer satisfaction at PT. Globat Jet Express (J&T) Surabaya. *Journal of Management Science and Research*, 8(7), 1-19. Retrieved from <http://jurnalmahasiswa.stiesia.ac.id/index.php/jirm/article/view/2319/2324>.
- [11] Ng, S.L., Rezaei, S., Valaei, N., & Iranmanesh, M. (2022). Modelling services continuance intention: Evidence from apps stores. *Asia-Pacific Journal of Business Administration*. doi: 10.1108/APJBA-08-2021-0408.
- [12] Prasetyo, A.H., Rustamaji, D., Sumarni, S., & Nadhifah, N.I. (2022). The influence of service quality, price perceptions and communication skills on customer satisfaction at PT. JNE Babat Lamongan. *Journal of Economics and Sharia Economics*, 5(1), 463-472. doi: 10.36778/jesya.v5i1.614.
- [13] Santi, S., & Putra, A. (2021). The influence of perceived price, promotion, service quality and café atmosphere on customer satisfaction at Bumi Café in Batu Bara. *Journal of Management, Science Economics*, 3(1), 84-93. Retrieved from <http://jurnal.una.ac.id/index.php/mes/article/view/2212/1709>.
- [14] Saputri, R.S.D. (2019). The effect of service quality and price on customer loyalty Grab Semarang. *CoverAge: Journal of Strategic Communication*, 10(1), 46-53. doi: 10.35814/coverage.v10i1.1232.
- [15] Sarstedt, M., & Cheah, J.-H. (2019). Partial least squares structural equation modeling using SmartPLS: A software review. *Journal of Marketing Analytics*, 7(3), 196-202. doi: 10.1057/s41270-019-00058-3.
- [16] Subaebasni, S., Risnawaty, H., & Wicaksono, A.R.A. (2019). Effect of brand image, the quality and price on customer satisfaction and implications for customer loyalty PT Strait Liner Express in Jakarta. *International Review of Management and Marketing*, 9(1), 90-97. Retrieved from <https://www.econjournals.com/index.php/irmm/article/view/7440>.
- [17] Sugiyono, A. (2018). *Quantitative research methods, qualitative, and R&D*. Bandung: Alfabeta.
- [18] Suhardi, Y., Syachroni, A., Burda, A., & Darmawan, A. (2020). The influence of product diversity, price perceptions, and service quality on consumer purchasing decisions. *Journal of STEI Economy*, 29(2), 17-30. doi: 10.36406/jemi.v29i2.340.
- [19] Sukarsih, N.K.O., & Suputra, G.A. (2021). The influence of service quality, price, location and promotion on consumer satisfaction at the Habitat Ubud restaurant. *Widya Amrita: Journal of Management, Entrepreneurship and Tourism*, 1(3), 861-872. Retrieved from <https://ejournal.unhi.ac.id/index.php/widyaamrita/article/view/1406>.
- [20] Tjiptono, F. (2012). *Strategic marketing*. Yogyakarta: Andi.
- [21] Tzeng, S.-Y., Ertz, M., Jo, M.-S., & Sarigöllü, E. (2021). Factors affecting customer satisfaction on online shopping holiday. *Marketing Intelligence & Planning*, 39(4), 516-532. doi: 10.1108/MIP-08-2020-0346.
- [22] Yanti, N.W.E., & Puja, I.M.S. (2021). The influence of service quality, price and promotion on customer satisfaction at printing UD. Wipra Print Karangasem. *Widya Amrita: Journal of Management, Entrepreneurship and Tourism*, 1(3), 943-953. Retrieved from <https://ejournal.unhi.ac.id/index.php/widyaamrita/article/view/1415>.

**Нованда**

Студент

Університет Гунадарма

16424, Jl. Margonda Raya, 100, м. Депок, Індонезія

<https://orcid.org/0009-0007-6924-3894>

**Хенні Медьяваті**

Кандидат економічних наук, доцент

Університет Гунадарма

16424, Jl. Margonda Raya, 100, м. Депок, Індонезія

<https://orcid.org/0000-0001-7119-1711>

## **Визначальний фактор задоволеності споживачів Shopee Xpress у Великій Джакарті**

**Анотація.** Логістика відіграє важливу роль у сприянні корпоративній торгівлі шляхом надання необхідних послуг для доставки товарів від виробників до споживачів. Тому важливо враховувати ставлення та поведінку споживачів, пов'язану із задоволеністю послугами, що надаються логістичними компаніями. Метою дослідження є аналіз впливу якості послуг, сприйняття ціни та просування на споживчу задоволеність споживачів Shopee Xpress та визначення того, які змінні є найбільш домінуючими. Метод аналізу, використаний у цьому дослідженні, – частковий метод найменших квадратів. Були проведені наступні етапи тестування: тест на збіжну валідність, дискримінантну валідність, комплексну надійність, альфа Кронбаха, R-квадрат, F-квадрат, прогностичну релевантність, придатність до експлуатації та коефіцієнт шляхів. Дані, використані в цьому дослідженні, були отримані за допомогою анкетування, і було зібрано валідні дані 120 респондентів. Метод вибірки в цьому дослідженні – неімовірнісна вибірка з технікою цілеспрямованого відбору. Результати показали, що змінні якості обслуговування та просування впливають на задоволеність споживачів, але змінна сприйняття ціни не впливає на задоволеність споживачів, а найбільш домінуючою змінною на задоволеність споживачів є змінна просування. Змінні якості обслуговування, сприйняття ціни та просування одночасно впливали на споживачів Shopee Xpress у Великій Джакарті. Результати дослідження доводять, що три досліджувані змінні визначають споживчу задоволеність користувачів служби доставки Shopee Xpress у Великій Джакарті. Це дослідження сфокусоване на компаніях, де більше людей вирішують скористатися послугами, що надаються, підкріплені рекламними акціями та сприйняттям адекватних цін, а результати дають практичні рекомендації щодо покращення якості обслуговування цих самих компаній у майбутньому

**Ключові слова:** логістичні послуги; просування; маркетинг; якість обслуговування

UDC 658.14/.17.657:330.8(4)9

DOI: 10.56318/eem2023.02.035

Olesia Lemishovska\*

PhD in Economics, Associate Professor  
Lviv Polytechnic National University  
79013, 12 Stepan Bandera Str., Lviv, Ukraine  
<https://orcid.org/0000-0002-5695-0924>

## Methodological tools in the processes of income and expenditure accounting: Contemporary discussions and developments in Galicia at the turn of the century

**Abstract.** Analytical reviews at the international level highlight the issue of the quality of public reporting information on the performance of companies and their economic potential. The component and subject of these discussions is the use of alternative methods in the accounting system – “comparison of income and expenses” and the “balance sheet approach”, which significantly affect the results of the calculated indicators. The purpose of this study is to formulate proposals for solving existing problems and analyse the best practices of accountants in Eastern Galicia in the second half of the 19th and mid-20th centuries to identify successful ideas for their use in modern research. The study uses a system of general scientific methods and specific techniques to clarify the role and significance of accounting information in the architectonics of the modern economy. The scientific results substantiate the author’s opinion that the information presented based on the approach of coordinating (comparing) income and expenses objectively reveals the level of performance of modern companies, and therefore, more meets the real needs for management processes and the functioning of the market mechanism. The paper substantiates that the methodology of “coordination of income and expenses” should be given more weight in accounting theory and practice, and the results obtained on its basis should take a more significant position in the system of market analytics criteria. The balance sheet approach with its fair value principles in the accounting system is considered necessary, but its application should be considered as an additional tool for providing information to investors and counterparties of the market process. On its basis, companies provide the capital and investment markets with information in their public financial statements about the state and structure of their actual financial and economic potential. The scientific results also include the methodological developments identified and evaluated in past studies, which are reasonably recognised as applicable to modern realities. The paper is valuable because the introduction of the studied methods into practice based on their proposed parity use and some provisions from past developments regarding the measurement of income and expenses will positively affect the information content and transparency of public reporting of modern companies

**Keywords:** accounting; public reporting; market environment; revenue and expenditure approach; balance sheet approach; historical developments

---

### Article’s History:

Received: 10.09.2023

Revised: 18.11.2023

Accepted: 16.12.2023

### Suggested Citation:

Lemishovska, O. (2023). Methodological tools in the processes of income and expenditure accounting: Contemporary discussions and developments in Galicia at the turn of the century. *Economics, Entrepreneurship, Management*, 10(2), 35-47. doi: 10.56318/eem2023.02.035.

\*Corresponding author



Copyright © The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

## INTRODUCTION

In a modern globalised economy with an expanded network of capital and investment markets, discussions about the objectivity of publicly presented information about the real performance of company's activities are becoming more relevant. Criteria for disclosure of the effective functioning of an economic entity operate in a wide range, but most often use such indicators of the accounting and reporting system as sales volumes, profit (loss), and changes in the cost of equity. From the standpoint of the market mechanism (market economic assessment), the position is that accounting relevant and transparent public information allows assessing the current and predictive characteristics of the value of shares (equity) of companies on a more reasoned basis. However, in many theoretical presentations and practical reviews in relevant scientific publications, quite convincing arguments are given that the information formed based on modern accounting standardisation does not objectively reveal the results of operational activities and the cost expression of the productive power of the estimated financial and economic resources, does not reflect the real economic nature of the relationship between profit and capital.

At the international level, there was a debate about the use of one of two alternative accounting methodological approaches in the accounting and reporting system – “balance sheet” (“active – passive”) and “based on the coordination of income and expenses”. The methodological tools included in them significantly change the calculated total result of the company's activities. The first one is recommended by international accounting and reporting standards and focuses on reporting assets measured at fair (present) value. The second one, when calculating the financial result, focuses accounting procedures on the use of past historical expenses (accounting and writing off assets at the purchase price).

C.R. Baker (2019) makes convincing arguments that neither the balance sheet nor the income-expenditure approaches can be fully implemented in practice. With the current dominance of the balance sheet approach, information obtained using the accounting methodology for comparing operating income and expenses is still considered as a basic basis for the process of balancing the total results of the company's functioning. Ukrainian researchers A. Oriekhova & V. Tolstosheeva (2021) also note that market relations require revision and improvement of accounting for financial results, which are simultaneously affected by the method of reflecting income and expenses, and assets and liabilities. I. Chernikova & A. Poluliakh (2020) from the same standpoint, characterise the existing dualism in accounting methodology, noting that financial result as an accounting category is calculated either with the dominance of the methodology based on the difference between income and expenses, or is established considering changes in the amount of capital. L. Baruch (2018) makes a compelling argument that “as a result of excessive emphasis on the fair value of assets while neglecting the matching of income

and expenses, the traditional emphasis on profit disclosure in reporting, which continues to be an essential element for investors, has disappeared”.

In the study of E. Braun (2022), a substantive comparison of accounting methods of comparing income and expenses with the balance sheet approach is based on the analysis of the impact of accounting and reporting information on market conditions and equilibrium. This paper concludes that the introduction of fair value into the accounting system destroys the very basis of the market pricing process. Similar is the opinion of Ukrainian researchers K. Shevchuk & V. Bondar (2019), who noted that since the final results of an enterprise's activity affect not only its economic situation, but also the level of social production and consumption, it is necessary to take a more thorough and qualified approach to the development of its components – income and expenses, studying in detail and analysing the factors under the influence of which the financial result is formed. From the same macroeconomic standpoint, I. Pushkar & H. Nikolaeva (2021) consider areas of improvement of accounting and analytical support for the development of financial results, substantiating that they lie in the plane of detailing information on income received. Supporting such a development of the accounting and reporting system, H. Nazarova *et al.* (2020) note that the financial result, which is determined by comparing income and expenses, more objectively provides information to internal users for making managerial decisions.

The purpose of the study was to summarise modern discussions on the existing problem of using a more appropriate methodology for generating information about income and expenses in the accounting and reporting system of modern enterprises. The overall goal also includes conducting a retrospective analysis of past developments to identify successful ideas on the topic under study. The general methodological foundations of this study are based on the main function of the accounting system – reflecting the efficiency of activities (income, expenses and financial results) and the resource potential of the business entity. The research was carried out using general scientific methods and specific techniques in the field of accounting, management, and economics. When analysing and evaluating past developments, the methods of historical and logical analysis were used, which provided an objective review of the theoretical foundations and practices of reflecting the company's performance in accounting and public reporting. The conceptual and methodological foundations of the study are built based on the author's chosen content, a combination of the results of modern research and analysis of the solution of this problem in the past. The elements of scientific originality include the results of establishing separate accounting approaches to accounting for income and expenses that are relevant for modern research, formulated in papers published on the territory of Eastern Galicia in the period from the second half of the 19<sup>th</sup> century to the middle of the 20<sup>th</sup> century.

## INTEGRATION OF ACCOUNTING AND MANAGEMENT ANALYTICS: FROM PUBLIC FINANCIAL STATEMENTS TO MARKET VALUE AND SUSTAINABILITY MODELS

The role of public financial reporting indicators in the company's management system and in market analytics models in the field of accounting and management is discussed in various contexts. At the methodological level of the accounting field of knowledge, the paper analyses the compliance of the use of the "operating income and expenses comparison" or "balance sheet method" approach in accounting with the current economic conditions. The debate on this issue raises questions about the impact of each of them on the value of the calculated financial result and the publicly presented value of financial and economic potential. In the literature, the current focus of accounting and reporting on the balance sheet model is generally characterised as quite rational and appropriate for the needs of the modern architecture of a market economy.

For a long period of time, questions have been discussed about the choice of the base and tools for verification of the company's performance (efficiency) in the accounting system. This line of research is aimed at comparing the accounting profit indicator with the market value criterion (Hax, 2003), that is the debate lies in the coordinates of historical and just value discussions. Some of the authors support accounting for fair value and indicate the erroneous application of present value in the modern economy, however, arguing for the need to develop an alternative conceptual framework (Rayman, 2007). Other authors, such as C. Laux & C. Leuz (2009), prove the existing obvious signs of crises of use in fair value accounting. In discussions on the research area, R. Barker & S. Schulte (2017) set the following question: if the introduction of the "fair value" of a certain tangible or intangible asset into the accounting system was fully confirmed, then the market mechanism (market analytics) would not be so in dire need of "useful information" as public financial statements are considered. That is, this refers to the fact that the fair value of a particular asset available to the company in the accounting system is recorded based on (with the help of) information from the market. Based on this state of affairs, A. Oriekhova & V. Tolstosheeva (2021) argue that market relations require revision and improvement of the system for providing information in the statement of financial results (statement of comprehensive income). Regarding Ukrainian practice, I. Chernikova & A. Poluliakh (2020) note that "the current regulatory framework for the organisation of accounting for income, expenses, and financial results does not allow fully meeting the needs of internal and external users of accounting information, since there is not enough detailed information about financial results and their ratio to the company's income and expenses".

To understand the depth of the problem, researchers focused on a well-known paradox in financial accounting, noted by L. Moore (2011). The problem lies in the difficulty of simultaneously achieving high-quality profit indicators for the reporting period and providing information on the

value of assets and liabilities at fair (present, market) value. The reflection of the real value of assets requires their re-valuation at present value, that is, accounting procedures, which, in turn, distort the objectivity of the calculated financial results. Theoretical developments provide arguments about the possibility of partially overcoming the existing problem based on analysis of the basic methodological foundations formulated in the past. T. Berdnikova (2011) considers that "synthesis of the best achievements of well-known accounting schools and analysis of the best practices of well-known researchers of the past can enrich accounting thought and ensure progress in improving the accounting of financial results of enterprises of the modern economy". A similar (related) view to Ukrainian scientists is held by the well-known American researcher L. Baruch (2018). Exploring the reasons for the deterioration in the usefulness of financial statement information and formulating the opinion on how to change this, the researcher concludes: "if coordination of revenues and expenses is a prerequisite for high-quality earnings information that is the focus of investor attention, then the income statement model developed in the past (the matching model) is not a relic of the past, but should be the guiding principle for building and improving modern accounting standards".

Modern publications in relevant scientific journals on the topic of this study also rely on past developments. In particular, this applies to the papers by representatives of the Austrian school of economics and the German school of accounting (Mises, 1920; Schmalenbach, 1931). In modern developments, it is noted that they formulate a sufficiently reasonable model for calculating the effectiveness of the capital cycle by comparing the costs incurred and the income received. For example, E. Braun *et al.* (2016) used the approach of L. Mises to capital in order to show how the market process can be explained based on the approach of the Austrian school. The study by M. Olbrich *et al.* (2015) also relies on business evaluation approaches based on the Austrian School. In developments aimed at formulating the reporting parameters of the relevant concepts of sustainable development, an expanded view of capital is also used, considering its cost form of social and environmental components.

## PUBLIC FINANCIAL STATEMENTS AND THE MARKET ENVIRONMENT: CONTENT RELATIONSHIPS

To emphasise the role and importance of information of the accounting system and indicators of public financial statements in market processes, the paper analyses the generalised view of scientists on the disposition of reporting indicators as instrumental components in the system of market mechanism. R. Marshall & A. Lennard (2016) revealed exactly how the choice of the basis for measuring income and expenses in the accounting system and the information expressed in the reporting indicators affects the assessment of various market processes. From the standpoint of the functioning of the system and complex market tools, researchers hold the view that accounting institutions

are a “logical necessity of the market process, and the accounting function in this context has a reinforcing impact on the process of market balancing” (Braun, 2022). Modern advances in communication and information technologies have not significantly affected the format of financial (accounting) reporting. Public financial statements, as in previous periods, are intended to reveal the efficiency (effectiveness) of the company’s activities and the existing economic potential. The standardised content and essential parameter of public financial reporting indicators is considered from the standpoint of the non-equilibrium state of the current market environment. When processing further material, the author of this study adheres to the position that the profit shown in public financial statements should follow from transactions actually implemented (cash method of income recognition). The profit indicator calculated on the basis of a comparison of income and expenses is more realistic, and the information base of reporting in this case becomes more reliable to ensure the operation of the “invisible hand” in a market economy. This, to a greater extent, theoretical conclusion is confirmed by the results of surveys conducted at the practical level (Dichev *et al.*, 2013). They concerned the significance (weight) of criteria for ensuring the quality of accounting information about the financial results of companies. Systematic data showed that “92% of chief financial officers surveyed consider accounting policies to match income and expenses”.

Many modern analytical reviews point to a decline in the usefulness of information in companies’ financial statements. Empirical evidence is provided that the accounting and reporting information generated according to standardised requirements not only does not objectively reflect the company’s performance for the reporting period, but also does not allow investors to predict future results and explain the dynamics of share prices based on it. Investors, chief executive officers and market analysts discuss the relevance and usefulness of information in financial statements. L. Baruch (2018) cites the results of surveys that indicate both the general view and the reasons for the decline in the information usefulness of public reporting of companies. They are primarily concerned with “the growing gap between capital market performance and financial information, especially in terms of reported earnings”. This and similar theoretical conclusions are confirmed by the results obtained by Y. Biondi (2015) by conducting economic analysis using mathematical and experimental modelling. The study was aimed at identifying the level of influence of public reporting information on the establishment of expected market prices of shares in the future.

Balance sheet items provide information on the cost expression of the company’s available economic resources, capital, and liabilities. In modern balance sheets, such values are a mixed set of historical, fair, and some questionable valuation techniques. This group should also include the reflection in the balance sheet of various types of reserve and insurance sources to ensure unpredictable processes of capital loss without their support by actually created

property values (fictitious capital). The above significantly confuses and in many cases misleads external users about the real potential of the company. It is worth noting that at present, in fact, there is no alternative to financial statements in the form of a formalised integrated information system for the market mechanism.

The real existence of these and some other problems leads to the need for additional disclosure of operational data in various types of non-financial reporting. They provide alternative accounting standardisation data on income and expenses (one-time, random, etc.), which in one way or another affect the perception of external users about the company’s profitability for the reporting period. Since this type of adjustment is different in different companies, therefore, such information should be considered to be of limited use to external users (market analytics). Many of these speculative accounting procedures are difficult to disclose to external users of public statements, especially when it comes to deferred income and expenses or internally generated goodwill. In financial statements, an important criterion for external analytics is the ability to compare the correspondence of income data with cash flows within a particular company. Despite this, it can be interpreted with confidence that the profits in the accounting system determined by different conceptual and methodological approaches, which are used by different companies, to a certain extent, level the basis for comparative analysis (evaluation) of the effective activities of various market economy entities.

Modern approaches to the formation of reporting indicators focus on the fair value of a company’s assets and liabilities and its comprehensive income. This leads to the fact that the market environment is actually provided with somewhat conditional information, since on this basis it is declared that companies actually own the value expressed in the financial statements. In fact, the values estimated in the financial statements are based on the rather speculative assumption that the modern market is absolutely liquid at face value of long-term assets. In this context, T. Schildbach (2012) draws attention to such a somewhat paradoxical point, which is that it is the market that provides fair value information for the accounting system and at the same time uses it as formalised by this system. This is especially true for the entire group of intangible assets (the productive power of this type of resource potential, and with it the cost and its write-off). Many researchers hold the position that it is the problem of intangible assets that is the main reason for the deterioration of the usefulness of financial information for investors.

In recent years, there have been discussions about the recognition of intangible assets in accounting and the problems of accounting methodology to adequately reflect these assets. The same applies to goodwill, most of the elements of which are very vague (illusory), and therefore evaluated subjectively. There are also some arguments about including items in the balance sheet that cannot be clearly and unambiguously qualified as assets or liabilities (deferred income and deferred expenses). From a methodological standpoint, this can be classified by the accounting

technique “smoothing the reported income and its volunteerism”. From the standpoint of economic matter, information about profit (retained earnings, uncovered loss) is still very conditional, since the balance sheet asset does not provide sufficiently reliable equivalents.

The purpose of the study was not only to consider the current problems, but also to identify successful accounting decisions in the past, in particular in theoretical developments formulated on the territory of Galicia or implemented approaches to accounting for income and expenses. Such content is also used in other modern research. For example, Y. Biondi (2008) in his study uses the basic principles of economic theory of the famous scientist Joseph Alois Schumpeter through the prism of a dynamic accounting view of the firm. J. Schumpeter started his scientific activity on the territory of Austria-Hungary covered by the time frame of this study. He believed that it is expedient to use a dynamic accounting approach to present an economic entity in the market environment. The accounting system in this context has been characterised as a “sublime monument” in terms of cost – profit calculus and a type of activity that “powerfully drives the logic of the enterprise” (Schumpeter, 1987). This definition reflects the current view (mostly declarative) on the content of the relationship between public financial statements and the market environment. It is also worth noting the opinion of this researcher regarding the applied level of disclosure of the generalised economic category “capital”: “how many confusing and absurd disputes could have been avoided if economists had adhered to the accounting values of this term and the expression of capital”.

The above is intended to draw attention to the rather speculative modern operation in the capital and investment markets of the intangible component of companies' equity. The scientist argued that the concept of “capital” is monetary in essence and means either real money, or the right to money, or some goods that are valued in money. This definition largely confirms the accounting principles and criteria for capital recognition, which should also prevail in modern accounting conventions. The approaches to the category “capital” in accounting manuals and textbooks were similar to this. For example, it was noted that “the account of financial results (gains and losses) in its economic content is not only a result account, but directly a capital account, that is, an account of a proportionate (interrelated) reflection of property and capital gains” (Ciompa, 1910). In modern methods of estimating the value of companies, approaches to determining the value of equity of market entities are formulated on this basis.

### **COMPARISON OF THE METHODOLOGICAL BASIS OF INCOME-EXPENDITURE AND BALANCE SHEET APPROACHES AS A BASIS FOR MEASURING PROFITABILITY IN THE ACCOUNTING SYSTEM: A MODERN VIEW AND HISTORICAL EXCURSION**

The balance sheet model is based on the fact that income reflects changes in net assets (equity) between two reporting

periods. The income statement model considers the performance of an enterprise by comparing recognised income and expenses for the reporting period. In modern practice, based on a certain combination of both approaches, an information basis is formed for analysing the efficiency (effectiveness) of an economic entity's activities. In the first model, profit refers specifically to expenses incurred and income received by the business entity, and therefore, the information generated on this basis is generally perceived as more specific. The accounting system informs an individual firm about the effectiveness of the financial and economic actions actually performed by it, which are informally close to the monetary profit received (Braun, 2022).

The reasons for the previously mentioned “deterioration in the usefulness of financial information” in the research are noted: “the neglect of organisations that set accounting standards, the traditional model of the income statement (the approach of comparing income with expenses) and setting priorities in favour of the balance sheet model (asset valuation)” (Baruch, 2018). It is considered that the approach based on the correspondence of income and expenses corresponds to the universal business model of spending resources in the process of making a profit. In analytical reviews on this topic, the real problem of the balance sheet model is seen not in its very conceptual basis, but in the inability to adapt the rules for accounting recognition and valuation of assets in the context of dynamic replacement of tangible assets with intangible ones. The analytical publication by E. Braun (2022), comparing the income and expense comparison method with the balance sheet approach, notes that high-quality earnings should be considered those that are stable and recurring, supported by actual cash flows in the absence of significant impact of one-off items and long-term estimates.

Based on the purely methodological content of the accounting system tools, a direct comparison of income-expenditure and balance sheet approaches can be carried out to a greater extent only at the abstract and logical level. At the same time, based on a generalising (estimated) view, the author of this study adheres to the position that the modern accounting and reporting system is largely removed from determining the total amount of profit based on actual operations. It is also recognised as real that in the methodology for comparing expenses and income, a significant problem point is the reflection of non-expendable assets and liabilities of a modern company. The principle of reflecting historical expenses in the balance sheet for such assets does not make much sense for the capital market. N. Hax (2003) holds the position that this component of the overall problem should be considered as one that cannot be solved perfectly. At the beginning of the 20<sup>th</sup> century, the basic principles of accounting and procedural methodology for comparing income and expenses for the reporting period were mainly formulated. They should be considered sufficiently suitable for determining net income, provided that companies operate in an industrial-type economy. In the current conditions, the focus was not on

individual assets and liabilities and their value, but on the results of the enterprise as a whole. Therefore, in practice, the assumption was made that the capital invested in the enterprise (own and borrowed) should be recovered from operating income. This indicator can be used to determine whether the company's expenses made effective sense, taking into account the criterion for forming sources for possible dividends for shareholders.

In the conditions of a post-industrial (information-intellectual) type of economy, this method of calculating total net income still cannot be considered suitable even if it is adapted. The conceptual basis of "dynamic accounting" (Schmalenbach, 1931) is formulated, which implies a continuous change in the dynamic environment (a market process outside equilibrium), and the balance sheet ("static accounting") is speculatively based on the stability of the external environment, in which equilibrium conditions prevail. The ideology of international standardisation of financial statements is based on the concept of fair value. The provisions of certain standards allow the use of prices for assets that could be obtained from its sale or the measurement of liabilities in a normal transaction between market participants at the valuation date.

Profit or loss in modern recognition is total income less expenses, excluding components of other comprehensive income. Total comprehensive income – this is a change in equity over the period and includes all components of "profit or loss" and "other comprehensive income", which, in turn, contains items of income or expense not recognised in profit or loss. The components of other comprehensive income are: changes in equity as a result of revaluation of property, gains and losses from investments in equity instruments measured at fair value, reflecting this result in other comprehensive income. In today's market environment, there is no guarantee that prices will remain the same until the company decides to sell the asset. Here it is obvious that information about fair value, and with it its materiality, is transferred to an unspecified future period.

The income statement model (comparison of income with expenses) was formulated in a generalised form as early as the 1930s. It is presented in a more formalised form in the monograph by W.A. Paton *et al.* (1940). In relation to fair value, it states: "when accounting is deprived of the anchor of real facts, it floats in a sea of psychological (subjective) estimates ... accounting as such cannot express them rationally". It is emphasised that accounting is not a process of evaluation by its very nature, but the distribution of historical expenses and income for the current and subsequent financial periods. Public instruments in the reporting system are the income statement and balance sheet, the first of which provides information on the attribution of income and expenses for the current period. The balance sheet shows the expenses incurred, which, according to the accepted principle, relate to future accounting periods.

The value of the calculated performance indicator is also affected by "expenses" of a non-financial nature, in particular, accrued depreciation on non-current assets (fixed

assets and intangible economic potential). The procedure in the accounting system here actually concerns writing off a part of the previously estimated fair value of an intangible economic potential. The problems of accounting for non-financial assets in the context of market prospects are well disclosed in the study by R. Barker & S. Schulte (2017), where the main problem situation is the uncertainty of the future (the expected economic life span of non-expendable assets) and, consequently, the establishment of a depreciation rate. Depreciation in the income and expense approach is consistent with the general idea that they correspond to accrued expenses and income (cash flows) that these assets generate. For the balance sheet approach, the amortisation method is the result of the difference between the fair value of the firm's assets at the beginning of the period and their present value at the end of the period; value added to total expenses will only be reflected if the fair value of the assets or liabilities of the relevant company has changed. There is no objection because intangible assets capitalised and recorded on the balance sheet should be subject to periodic depreciation and amortisation. In modern approaches, this applies to the depreciation of acquired intangible assets, and functionally identical internally created intangible assets are immediately written off as expenses. Consequently, the financial performance of companies that use different innovation strategies (internal creation or acquisition) cannot be compared.

### ACCOUNTING AND PROCEDURAL METHODS IN PAST DEVELOPMENTS IN GALICIA

Various factors influenced the choice of the methodology for accounting for income, expenses, and results of an enterprise in the studied territory of Austro-Hungarian Galicia. Within the specified time frame, the accounting sphere (theory, practice, training) of this state entity and all its provinces was based on the principles of the German school of accounting. The developments of the Austrian school of economics and regional economic developments permanently caused the predominance of certain approaches to the reflection of the objects under study in the accounting system. Due to the influence of many factors on individual somewhat self-governing territorial entities of this monarchy, a rather special type of so-called "provincial accounting" was established (legislative definition and regulations for the possibility of building accounting practices that are adaptive for the specifics of a particular province).

The materials reviewed show that, both in theory and in practice, accounting profit has been permanently associated with the arithmetic value of the assets taken into account (the cost of capital estimated according to a certain approach) for the reporting period or a comparison of recognised operating income and expenses. First of all, it is necessary to give a basic basis on which the region relied when developing its own theoretical foundations and practical organisation of the accounting system. The most "authoritative" work for the organisation of practical accounting and professional training of accountants was

R. Reisch & K. Kreibig (1907). It clearly expressed the personalistic content of the effective account: “the profit and loss account is an intermediary (link) between individual analytical effective accounts and the capital account (net profit is transferred to the capital account”. In the Encyclopedia of accounting by R. Stern (1902), which, like the previous paper, was used in accounting practice at Galician enterprises, noted: “the profit and loss account, as well as the income and expense accounts, are those that relate to changes in property accounts. The net profit is the existing property fund discovered through the balance sheet, exceeding the initial contribution”.

The textbooks and manuals under study include some of those prepared and published by university (academic) educational institutions of the Ukrainian diaspora established between the two world wars. The materials given in them objectively made a significant contribution to the development of the accounting sector in the western Ukrainian lands, since they were used in close cooperation by cultural and educational societies and professional organisations of the Galician region. The materials of some of the reviewed accounting textbooks mainly begin with a description of the concept of capital and disclosure of the determinacy of its changes in determining the results of an enterprise’s activities.

The presentation of the accounting methodology for calculating the results of an enterprise’s activity, as in the textbook by Ya. Moraleyvych (1924), was based on the capital of the enterprise and its changes previously recorded by the accounting department. In this textbook, it is proved that “the termination of accounting activities ends with the main balance sheet account “capital account” with a certain balance on it, which shows the amount of property growth and capital growth and is called net profit”. The approach to determining the performance of an enterprise, which is carried out by comparing the sum of the balance sheets at the end and beginning of the year, is also presented in textbook by K. Bezkrivnyi (1932). The author’s justification of this methodology was based on the economic postulate formed at that time that profit is formed as a result of the cycle of all capital involved by the enterprise. Based on this, “the essence of accounting was determined, which consists in recording the initial state of property and obligations and the changes that occur in them”.

It is also necessary to cite some approaches to calculating the results described in textbooks prepared and published directly in Galicia. Thus, for example, P. Ciompa (1910) proceeded from the following point: “if the results (profit, loss) are presented in the accounts as an increase or decrease in property (share), then these results should also cause an equivalent increase or decrease (reaction) in capital accounts”. In practice, the calculation of the result activity of business entities was mainly carried out through changes in the property status previously recorded in the accounting system based on financial and economic operations actually performed by the enterprise. The approach reflected in the accounting training manuals essentially

followed the principle of the well-known development of E. Schmalenbach (1931), in particular, it was argued that in order to determine (establish) the objective amount of profit, one should focus on the movement of monetary expenses and income.

In any past or modern accounting methodology, the starting point is the issue of asset valuation. In the accounting environment of that time (theory and practice), as in the modern scientific community, the problem of applying prices for certain types of assets was discussed. For many of the authors’ opinions, a significant role was played by the formulated basis of valuation by R. Reisch & K. Kreibig (1907), which promoted the idea that “values intended for consumption should be calculated at use value, and those included in the processes of sale – at exchange value”. Many of the papers considered in this study reflect just such an approach to valuation, according to which assets were registered at historical value with subsequent reflection on the balance sheet of valuations linked to the current market value. The basic provisions set out in monograph by W.A. Paton *et al.* (1940), also used in the study by Y. Biondi (2015), are presented as German-American relations in the processes of formulating approaches to determining profit in accounting. The studied regional accounting textbooks published on the territory of Galicia contain references to even earlier (1929) publications by A.C. Littleton, in particular, on the use of subjective managerial assessments in the accounting system. Similar justifications are given in the development of P. Ciompa (1910), which uses a political and economic view of the processes of production and exchange of goods: “the task of accounting is to calculate exchange values based on their manifestations in the national economy (national economy)”. This also concerned the methodology for separating market and random income (profits) in the accounting system, for which it was suggested that “the most appropriate way to keep separate accounts in the general ledger is to account for accidental gains and losses” (Bezkrivnyi, 1932).

The issue of creating reserve capital for writing off losses received, which is relevant for modern practice, was considered differently. The manual by K. Bezkrivnyi (1932) provides the following: “sometimes it happens that losses, despite the created collateral (capital reserve), exceed the benefits and not only equity, but even the capital invested in the business decreases, it is proposed to open an account of “losses of previous years” to reflect the amount that overstates the capital”. When it is written off, the loss from the balance sheet disappears, and the capital is reduced by the same amount.

The issue of forming appropriate principles for allocating expenses incurred between reporting periods was resolved, which is a particularly relevant subject in modern case studies. These included amounts paid for the firm (acquired goodwill), concessions, privileges, and organisational funds for improvement (the organisation of many enterprises sometimes requires quite significant costs), experiments, advertising, etc. In order to avoid a

“dubious” active balance sheet item or distortion of the calculated financial result for the reporting period, the textbook (Bezkrovnyi, 1932) suggests creating a “fund to cover expected losses”, that is, an item that “shows that some part of the property is intended to cover expenses or losses associated with operations of the previous period”. To apply this technique, it is proposed to open a subaccount called “arrangement account”. With this method, expenses are covered (written off) for 10 years, and the uncovered amount remains in the asset.

The amount of expenses and, accordingly, the calculated result of activities are directly influenced by the chosen depreciation methods, the objectivity of which was a debatable issue. The issues of achieving the highest level of objectivity of the amount of accrued depreciation and the amount of certain depreciation for various objects of non-current assets were among the most controversial in accounting science and practice. Regional developments were influenced by the concept of balance sheet depreciation (bilanzielle Abschreibung) and calculation depreciation (kalkulatorische Abschreibung), developed within the framework of the German accounting school. They considered accounting procedures for calculating depreciation through their view of it as a purely expenditure category (part of the cost price) with simultaneous accumulation of funds for the restoration of fixed capital. Balance sheet depreciation was interpreted as a tool for adjusting the valuation of amortised assets. Here it is necessary to cite some proposals formulated by scientists of Galicia regarding the methods of “covering

the value or depreciation of property: 1 – through a direct reduction in the value of property (entry on the credit of the main property account); 2 – through the establishment of capital to cover the value of property (entry on the credit of the capital account)” (Bezkrovnyi, 1932).

For this study, the educational and scientific papers developed on the territory of Galicia at that time were selected. Econometric balance theory by P. Ciompa (1910) was tested in elective classes with students and discussions with the teaching staff of the Lviv University of Trade and Economics. This scientific development is aimed at formulating an adaptive balance sheet format as the main form of public reporting to reveal the financial and economic potential of an enterprise from the standpoint of its functioning within the macroeconomic environment. The accounting and reporting system is considered from the standpoint of the usefulness of its information within the national economy (in modern research, the context of public reporting and the market valuation system). The calculation of the effectiveness of an enterprise’s activity in this theory is based on a combination of the balance sheet and revenue-expenditure methods considered in the paper. A profit and loss account that accumulates information about the company’s performance is considered in the capital accounts group. In the methodological basis of this theory, the ascending (basic) point is recognised as the fact that each property result gives, as a consequence, the same result of capital. Table 1 provides an excerpt from the general list of content of those topics related to the research topic.

**Table 1.** Extract of current topics from the content of the theoretical development of the book by P. Ciompa (1910)

Original language	English language
<b>ERSTER TEIL.</b> Gruppierung des Vermögens und Kapitals	<b>PART ONE.</b> Grouping of property and capital
a) Gebrauchsvermögen	a) productive assets
b) Ideales Anlagevermögen und Kapital	b) ideal (intangible) basic property and capital
<b>ZWEITER TEIL.</b> Die Erfolgsberechnung	<b>PART TWO.</b> Calculating performance
B) Preisgewinn mit Vorrat	B) Price profit, including inventory
D) Preisverlust mit Mengengewinn oder Mengenverlust und mit Vorrat	D) Losses based on price changes, considering the increase or loss of inventory quantity
III. Reine Erfolgskonten	III. Net performance accounts
C) Die Kapitalkonten	C) Capital accounts
a) Das Gewinn- und Verlustkonto	a) Profit and loss statement
b) Die Berechnung des Reingewinnes oder Verlustes in der Praxis	b) Calculation of net profit or loss in practice

**Notes:** III – the third chapter of part two. The extract is presented as it is presented in the book

**Source:** P. Ciompa (1910)

The calculation of net profit formulated by the author on this basis (Die Berechnung des Reingewinnes oder Verlustes in der Praxis) was also expressed in the construction of the income statement (Das Gewinn- und Verlustkonto). The result of the company’s activity was calculated based on the following principle: “profit of property value is equal to the increase in property and capital”. To objectively reflect this indicator, various forms of its appearance are considered: price profit, considering its hidden form in stocks (Preisgewinn mit Vorrat) and possible losses as-

sociated with price changes in the economy (Preisverlust mit Mengengewinn oder Mengenverlust und mit Vorrat). Based on a complex combination of using fake accounts, an accounting methodology for building a “net” effective account (Reine Erfolgskonten) was established.

In this development, sufficient attention is paid to the accounting and reflection of intangible economic resources in accounting statements. Traditionally, such values, both in past and modern practice, are reflected in the accounting system and are shown in the balance sheet only when they

are purchased for a fee. The context of the author's consideration of this issue is quite similar to the views of some modern researchers regarding the reflection of various types of intangible assets in public reporting (Baruch, 2018; Braun, 2022). The research development argues that "such values can and should be valued when they actually exist and have value without their direct purchase". Consideration of such an accounting object is presented through the category "ideal (intangible) fixed assets and capital" (ideales Anlagevermögen und Kapital) proposed by the author. The necessity and reasoned principled approaches to the introduction of the entire spectrum of intangible economic resources in the accounting and reporting system are justified – "various kinds of intangible assets that are the values of the main property and represent the actual value of the enterprise's capital".

In modern research, the main problematic issue is the cost measurement of intangible assets. Against this background, it is worth noting the opinion of P. Ciompa (1910) on the assessment of internally created economic resources of an intangible type: "in most cases, it is impossible to achieve a real assessment, so the highest care should be taken when calculating their book value". It is argued that "such intangible objects (values) should be attributed to the main property (their productive energy is fixed capital)", and "the need for their depreciation to avoid encumbrance of balance sheet items".

Considerable attention is paid to the importance of correctly reflecting in accounting and reporting information about "reserve assets and reserve capital" (Reservevermögen und Reservekapital) with the allocation of "real reserve funds" (Wirkliche Reservefonds). It is noted that "reserve funds very often have no value, and therefore they cannot be considered a separate type of capital" (Ciompa, 1910). Regarding the accounting of reserve and regulatory objects in the then period, this theory also considered the main problems that are the basis of most issues of modern accounting – the recognition issue, the valuation issue, and the classification issue.

Textbook by A. Sciborski (1912) was intended for mastering the skills of practical accounting and scenarios for studying sectoral types of accounting and its organisation in state, national, and municipal enterprises and private farms. The introduction of new mandatory regulations required the allocation of a separate section in educational and practical manuals, which "should carefully familiarise administrative officials, accounting and fiscal services with accounting methods for reflecting income, expenses, and financial results". Similar to the modern research discussed above, the textbook provides appropriate approaches to the establishment of accounting methodological tools for objectively determining the effective activity and existing potential of the enterprise. Table 2 shows a list of topics related to the area of research.

**Table 2.** Extract of topics from the book by A. Sciborski (1912) concerning the area of research

Original language	English language
<b>Rozdział IV.</b> Zmiany majątkowe, spowodowane przychodami	<b>Section IV.</b> Changes in property ownership caused by income
<b>Dział I. Rozdział I. Rozpoznanie majątku</b>	<b>Chapter I. Section I. Property recognition</b>
Oszacowanie majątku	Assessment of property ownership
<b>Dział II. Rozdział I. Zmiany majątkowe</b>	<b>Chapter II. Section I. Changes in ownership</b>
I. Prsz potrzebach (rozchodach)	I. Due to needs (costs)
II. Przy pokryciach (przychodach)	II. Through coverage (revenue)
<b>O wynikach jakie z zamknięcia rachunkowego okazać się mogą</b>	<b>Closing accounts that may affect the results:</b>
A. Co do przychodów	A. Which relate to income
B. Co do rozchodów	B. Related to expenses
<b>Bilans majątkowy</b>	<b>Property balance</b>
Sposób sporządzania bilansu majątkowego	Method of drawing up a property balance sheet

**Notes:** the extract is presented as it is presented in the book

**Source:** A. Sciborski (1912)

The author emphasised the direct dependence (influence) of recognised income for the reporting period on the property status of the enterprise (Zmiany majątkowe, spowodowane przychodami). Similarly to the current debate, the problem of assessing the property status of an enterprise (Oszacowanie majątku) was presented, considering the impact on its changes of the total amount of operating income and expenses (prsz potrzebach (rozchodach), przy pokryciach (przychodach)), including income of an opportunistic

nature, and the distribution of expenses between reporting periods. In a variant and debatable way, the material on methods of closing accounting accounts that may affect the results is presented (O wynikach jakie z zamknięcia rachunkowego okazać się mogą). The author separately provided a comparison of methods for reflecting income in the accounting system (Co do przychodów), and separately appropriate for practice, cost calculation methods (Co do rozchodów). The overall performance of the enterprise was still based on

a comparison of income with expenses, and the method of balance sheet generalisation (Sposób sporządzania bilansu majątkowego) was based on asset acquisition prices without any corrective procedures (Sciborski, 1912).

The book by A. Juliusz (1899) was published at the Dublyansk school as a textbook for higher field schools and practical application by agricultural enterprises in coordination with the National Department of the Kingdom of Galicia and Lodomeria. In this training manual, based on the established basic principles and principles of agricul-

tural accounting, approaches to accounting organisation adapted to regional conditions are added. In general, the material of the manual is presented from the standpoint of accounting functions in managing the economic parameters of large farms. It proposes specific approaches to calculating the performance of extensive farms, where the final result of the activity is crops that have no market equivalents, as they are consumed on the farm itself. For a general presentation of the manual, below is an excerpt of topics related to the study (Table 3).

**Table 3.** Content and list of current topics in the book by A. Juliusz (1899)

Original language	English language
<b>IV. Inwentura</b>	<b>IV. Inventory</b>
3. Szacowanie czyli oznaczenie wartości części składowych majątku	3. Evaluation or marking the value of property components
4. Pogląd krytyczny na błędne sposoby szacowania	4. Critical view of incorrect evaluation methods
<b>V. Wykaz przewidywanych obrotów gospodarskich (speranda, budżet, preliminarz)</b>	<b>V. Description of expected turnover (calculation, budget, estimate)</b>
2. Preliminarz przychodu i rozchodu pieniędzy	2. estimation of monetary income and expenses
4. Preliminarz przychodu i rozchodu paszy	4. Assessment of other income and expenses
5. Preliminarze rozmaite	5. Different types of ratings

**Notes:** the extract is presented as it is presented in the book

**Source:** A. Juliusz (1899)

Given the significant differences in prices in different provinces of the Austro-Hungarian monarchy, a significant part of the material in the manual is devoted to discussing the accounting valuation (value) of property components (Szacowanie czyli oznaczenie wartości części składowych majątku). The problem of the value expression of fixed assets (mostly land funds) was similar to modern discussions regarding the reflection of the fair value of long-term assets of companies of different national economies in terms of economic development. Just as the modern international standardisation of accounting and reporting does not consider the conditions of the subject's activity in the preparation and public presentation of financial statements, so at that time unified state mandatory instructions on the valuation of assets in the accounting system were developed. The manual therefore gave a critical look at incorrect evaluation methods (Pogląd krytyczny na błędne sposoby szacowania (Juliusz, 1899)).

In the manual, in the conventional practice of that time, the result activity of an enterprise in accounting was calculated by comparing operating income and expenses incurred, expressed in one way or another in monetary units. Based on this information, a generalised description of the expected turnover was established, calculations were made, and the budget and estimate of the farm were calculated (Wykaz przewidywanych obrotów gospodarskich (speranda, budżet, preliminarz)). The overall result of the farm's activity was based on the result of monetary income and expenses (Preliminarz przychodu i rozchodu pieniędzy). The above method was similar in content to the well-known developments discussed in this paper (Juliusz, 1899).

In order to streamline the economy of their farms, land-owners of western Ukrainian territories were forced to view the high importance of introducing their own accounting system to determine the results of management. In the publications of that time, arguments were given about the far-fetched (artificial) nature of introducing a monetary meter to the part of products that were used and consumed in their economy. In many cases, practice has shown that the use of speculative assessment methods significantly distorts the profitability of certain types of crop production, animal husbandry or processing shops calculated on this basis. Consideration of the objectivity (expediency) of applying estimates obtained from the external environment in the accounting system that existed at that time was similar to the modern debate about the use of fair value. The manual suggested different approaches and types of estimates for other income and expenses (Preliminarz przychodu i rozchodu paszy), which were still subjective in nature.

## CONCLUSIONS

The public presentation by socially significant companies of the objective result of their activities and the cost expression of their financial and economic potential of material and especially non-material types is not only a methodological problem of the accounting sphere. The information formalised in the financial statements about the effectiveness and real resource potential of market economy entities provides a more reasoned basis for establishing the company's market position, increases the efficiency of the market mechanism. Thus, dominance in the accounting system models based on the correspondence of income

and expenses are proposed to be considered as a guideline for improving modern standardisation of accounting. This approach will strengthen arguments about the principles of including items that cannot be unambiguously classified as assets or liabilities in the balance sheet summary. Giving priority to the methodology of matching income and expenses will, to some extent, also help to resolve the issue of capitalising intangible assets. Its use is limited by criteria for clear recognition of this type of economic resources using accounting procedures for attributing to deferred expenses those that cannot be identified. When accounting for intangible assets in public statements, a criterion for establishing their productive energy as part of fixed capital is proposed, and the need for their depreciation is argued to avoid encumbrance of balance sheet items.

The practices of accountants in Eastern Galicia in the second half of the 19<sup>th</sup> and mid-20<sup>th</sup> centuries, considered in the study, can be used in the modern methodology of allocating incurred expenses between reporting periods. This applies to those approaches and methods that provided the principles of attributing a certain part of the results of activities directly to the capital account. Methods of cost measurement in the accounting system of intangible assets

may also be in demand in modern developments and goodwill, most of the elements of which in the modern economy are uncertain (illusory), and therefore evaluated subjectively. For the development of modern standardisation, it is advisable to use the basic basis of past development, in which it is argued that intangible assets should be valued even without their direct purchase. This also applies to the method of separating market and random income (profits) in the accounting system.

An urgent issue for modern practice is the creation of real reserve capital for writing off losses received, and therefore, for the development of Ukrainian standardisation of accounting and reporting at a more in-depth level, it is advisable to consider methodological developments regarding the reflection of information on reserve assets and reserve capital, which are prospects for further research on this topic.

## ACKNOWLEDGEMENTS

None.

## CONFLICT OF INTEREST

None.

## REFERENCES

- [1] Baker, C.R. (2019). Commentary on Braun's "The ecological rationality of historical costs and conservatism". *Accounting, Economics and Law: A Convivium*, 9(1), 20160061. doi: 10.1515/ael-2016-0061.
- [2] Barker, R., & Schulte, S. (2017). Representing the market perspective: Fair value measurement for non-financial assets. *Accounting, Organizations and Society*, 56, 55-67. doi: 10.1016/j.aos.2014.12.004.
- [3] Baruch, L. (2018). The deteriorating usefulness of financial reports information and how to reverse it. *Accounting and Business Research*, 48(5), 465-493. doi: 10.1080/00014788.2018.1470138.
- [4] Berdnikova, T. (2011). Evolution of the development of accounting and analysis of financial results. *The Collection of Scientific Works of Kirovohrad National Technical University. Economic Sciences*, 20(1), 283-290. Retrieved from [http://nbuv.gov.ua/UJRN/Npkntu\\_e\\_2011\\_20\(1\)\\_43](http://nbuv.gov.ua/UJRN/Npkntu_e_2011_20(1)_43).
- [5] Bezkrivnyi, K. (1932). *Trade accounting: Course of lectures*. Poděbrady: Ukrainian Techno-Economic Institute for Extraordinary Studies in Poděbrady (Czech Republic).
- [6] Biondi, Y. (2008). Schumpeter's economic theory and the dynamic accounting view of the firm: Neglected pages from the theory of economic development. *Economy and Society*, 37(4), 525-547. doi: 10.1080/03085140802357927.
- [7] Biondi, Y. (2015). Accounting and the formation of share market prices over time: A mathematical institutional economic analysis through simulation and experiment. *Applied Economics*, 47(34-35), 3651-3672. doi: 10.1080/00036846.2015.1021461.
- [8] Braun, E. (2022). Accounting for market equilibrium – comparing the revenue-expense to the balance-sheet approach. *Accounting, Economics and Law: A Convivium*, 12(1), 1-23. doi: 10.1515/ael-2018-0024.
- [9] Braun, E., Lewin, P., & Cachanosky, N. (2016). Ludwig von Mises's approach to capital as a bridge between Austrian and institutional economics. *Journal of Institutional Economics*, 12(4), 847-866. doi: 10.1017/S1744137416000102.
- [10] Chernikova, I., & Poluliakh, A. (2020). Problem aspects of accounting organization income and expenses. *Market Infrastructure. Accounting, Analysis and Audit*, 43, 466-470. doi: 10.32843/infrastruct43-83.
- [11] Ciompa, P. (1910). *Outlines of an econometrics and the natural theory of accounting based on the national economy; Publisher of the commercial school association in Lviv*. Lemberg: Druck von Artur Goldman in Lemberg.
- [12] Dichev, I.D., Graham, J.R., Harvey, C.R., & Rajgopal, S. (2013). Earnings quality: Evidence from the field. *Journal of Accounting and Economics*, 56(2-3), 1-33. doi: 10.1016/j.jacceco.2013.05.004.
- [13] Hax, H. (2003). Measuring the firm's performance: Accounting profit versus market value. *Journal of Institutional and Theoretical Economics*, 159(4), 675-682. doi: 10.1628/0932456032584586.
- [14] Juliusz, A. (1899). *The science (principles) of accounting for the needs of a rural economy (published by former students of the former agricultural college in Zabikowo and the agricultural college in Dublany)*. Lviv: I. Union printing house in Lviv.

- [15] Laux, C., & Leuz, C. (2009). The crisis of fair-value accounting: Making sense of the recent debate. *Accounting, Organizations and Society*, 34(6-7), 826-834. [doi: 10.1016/j.aos.2009.04.003](https://doi.org/10.1016/j.aos.2009.04.003).
- [16] Marshall, R., & Lennard, A. (2016). The reporting of income and expense and the choice of measurement bases. *Accounting Horizons*, 30(4), 499-510. [doi: 10.2308/acch-51541](https://doi.org/10.2308/acch-51541).
- [17] Mises, L.V. (1920). Economic accounting in the socialist community. *Archiv für Sozialwissenschaft und Sozialpolitik*, 47(1), 86-121.
- [18] Moore, L. (2011). *Focusing on paradox in financial accounting*. [doi: 10.2139/ssrn.1740759](https://doi.org/10.2139/ssrn.1740759).
- [19] Moralevych, Ya. (1924). *Fundamentals of accountancy (lectures on cooperative courses of the Ukrainian villancuge-union*. Terezyn: Ukrainian Peasant Union in the Czechoslovak Socialist Republic.
- [20] Nazarova, H., Kononenko, L., & Kalashnikova, A. (2020). Accounting procedures of financial results calculation: Current state and the ways of improvement. *Economic Scope*, 156, 206-212. [doi: 10.32782/2224-6282/156-38](https://doi.org/10.32782/2224-6282/156-38).
- [21] Olbrich, M., Quill, T., & Rapp, D.J. (2015). Business valuation inspired by the Austrian school. *Journal of Business Valuation and Economic Loss Analysis*, 10(1), 1-43. [doi: 10.1515/jbvela-2014-0001](https://doi.org/10.1515/jbvela-2014-0001).
- [22] Oriekhova, A., & Tolstosheeva, V. (2021). Organizational aspects and problems of financial results accounting of enterprises. *State and Regions. Series: Economy and Entrepreneurship*, 6(123), 140-143. [doi: 10.32840/1814-1161/2021-6-24](https://doi.org/10.32840/1814-1161/2021-6-24).
- [23] Paton, W.A., Littleton, A.C., & Saratoga, E.L. (1940). *An introduction to corporate accounting standards: Monograph No. 3*. Lakewood Ranch, Florida: American Accounting Association.
- [24] Pushkar, I., & Nikolaieva, H. (2021). Directions of improvement of account of financial results on trade enterprise: Methodical aspect. *Investytsiyi: Praktyka ta Dosvid*, 22, 78-82. [doi: 10.32702/2306-6814.2021.22.78](https://doi.org/10.32702/2306-6814.2021.22.78).
- [25] Rayman, R.A. (2007). Fair value accounting and the present value fallacy: The need for an alternative conceptual framework. *The British Accounting Review*, 39(3), 211-225. [doi: 10.1016/j.bar.2007.03.006](https://doi.org/10.1016/j.bar.2007.03.006).
- [26] Reisch, R., & Kreibitz, J. (1907). *Balance sheet and tax*. Wien: I and II Band.
- [27] Schildbach, T. (2012). Fair value accounting and market information. *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung*, 64(5), 522-535. [doi: 10.1007/BF03373700](https://doi.org/10.1007/BF03373700).
- [28] Schmalenbach, E. (1931). *Dynamic accounting* (Vol. 5). London: Gee; Leipzig: Gloeckner.
- [29] Schumpeter, J.A. (1987). *History of economic analysis*. London: Routledge.
- [30] Sciborski, A. (1912). *A textbook for learning general and state accounting. Prepared according to the lectures of the court councilor Tadeusz Klusik-Orzechowski at the Imperial Roman Catholic University in Lviv: Part I*. Lviv: Printing house of Szczęśny Bednarski in Lviv.
- [31] Shevchuk, K., & Bondar, V. (2019). Financial results as the economic category and the features of displaying their in the accounting and reporting of the enterprise. *Economic Sciences. Series: Accounting and Finance*, 16(61), 158-166. [doi: 10.36910/6775-2707-8701-2019-16/61-17](https://doi.org/10.36910/6775-2707-8701-2019-16/61-17).
- [32] Stern, R. (1902). *Encyclopedia of accounting*. Vienna and Leipzig.

**Олеся Степанівна Лемішовська**

Кандидат економічних наук, доцент

Національний університет «Львівська політехніка»

79013, вул. Степана Бандери, 12, м. Львів, Україна

<https://orcid.org/0000-0002-5695-0924>

## **Методичний інструментарій в процесах обліку доходів і витрат: сучасні дискусії і розробки в Галичині на рубежі епох**

**Анотація.** В аналітичних оглядах на міжнародному рівні актуалізується проблематика щодо якості інформації публічної звітності про результативність діяльності компаній та їх економічний потенціал. Складовою і предметом цих обговорень виступає використання в бухгалтерській системі альтернативних методик – «зіставлення доходів і витрат» та «балансового підходу», які суттєво впливають на результати обчислених показників. Метою цієї роботи є формулювання пропозицій для вирішування існуючої проблематики, а також аналіз напрацювань бухгалтерів Східної Галичини другої половини ХІХ-го – середини ХХ ст. для виявлення в них вдалих ідей для їх використання в сучасних дослідженнях. У дослідженні використано систему загальнонаукових методів і специфічних прийомів для з'ясування ролі і значимості бухгалтерської інформації в архітектоніці сучасної економіки. Науковими результатами статті є обґрунтування авторської позиції про те, що інформація, представлена на основі підходу узгодження (порівняння) доходів і витрат об'єктивніше розкриває рівень результативності сучасних компаній, а тому більшою мірою відповідає реальним потребам для управлінських процесів та функціонування ринкового механізму. Обґрунтовано позицію про те, що методиці «узгодження доходів і витрат» слід надати більшої вагомості в бухгалтерській теорії і практиці, а отримані на її основі результати повинні зайняти більш вагому диспозицію в системі критеріїв ринкової аналітики. Балансовий підхід з його принципами справедливої вартості в бухгалтерській системі вважається необхідним, проте його застосування доцільно розглядати додатковим інструментальним засобом для надання інформації інвесторам та контрагентам ринкового процесу. На його основі компанії інформацією публічної фінансової звітності забезпечують ринки капіталів та інвестицій про стан та структуру реально існуючого в них фінансово-економічного потенціалу. Складовими наукових результатів є також виявлені та оцінені в досліджених минулих розробках методичні напрацювання, які аргументовано визнано придатними і для сучасних реалій. Дослідження цінне тим, що впровадження у практику досліджених методик на засадах пропонованого їх паритетного використання та деяких положень з минулих напрацювань стосовно виміру доходів і витрат позитивно вплине на інформативність і прозорість публічної звітності сучасних компаній

**Ключові слова:** бухгалтерський облік; публічна звітність; ринкове середовище; доходно-видатковий підхід; балансовий підхід; історичні напрацювання

UDC 331.1:37.015.311:32.019.51

DOI: 10.56318/eem2023.02.048

**Ihor Liadskyi\***

PhD in Agriculture, Senior Lecturer  
Poltava State Agrarian University  
36000, 1/3 Skovoroda Str., Poltava, Ukraine  
<https://orcid.org/0000-0001-6431-973X>

**Tetiana Diadyk**

PhD in Economics, Associate Professor  
Poltava State Agrarian University  
36000, 1/3 Skovoroda Str., Poltava, Ukraine  
<https://orcid.org/0000-0002-8422-3775>

## Managing social intelligence from the perspective of optimising labour market pricing

**Abstract.** The objective assessment of their labour value by future employers is a pressing concern for all students and graduates of higher education institutions. Young people frequently overestimate their salary expectations, leading to substandard service provision, or conversely, accept low-paying jobs resulting in emotional burnout due to lack of motivation. The purpose of this study was to identify how students with developed social intelligence assess their earnings prospects during their studies, in the first years after graduation and in adulthood. For this, a survey of students was conducted using the TROMSØ test and specially designed questions that helped to identify the respondents' subjective assessment of the value of their working time. The study found a statistically significant relationship between social intelligence and labour market pricing. This dependence is particularly pronounced for wage expectations immediately after the graduation ( $p \leq 0.01^{**}$ ). However, no correlation was found between social intelligence or its components and ambitions for the level of pay during study. It was found that students are willing to look for part-time work for any financial motivation. As for the level of salary that would fully satisfy them in adulthood, the average salary is three times higher than the minimum wage in Ukraine and equals USD 580. By understanding the level of a person's social intelligence, one can build an effective hiring system, gaining an additional tool for assessing possible salary ambitions. This will help to optimise the work of the HR department and understand the range of financial incentives needed required to stimulate a particular employee

**Keywords:** social competence; employment; career guidance; soft skills; HR marketing; labour force; salary

### INTRODUCTION

Pricing in the labour market is an essential element of building mutually beneficial labour relations between employees and employers. Traditionally, there has been a discrepancy between the salary expectations of job seekers and the approach of businesses towards financial motivation. It is

debatable what exactly influences the ambitions of future employees. It is reasonable to assume that, apart from external circumstances, the social and economic background in a country or the world, there must also be an internal, personal factor that forms the basis of a person's worldview.

#### Article's History:

Received: 05.08.2023

Revised: 14.10.2023

Accepted: 16.12.2023

#### Suggested Citation:

Liadskyi, I., & Diadyk, T. (2023). Managing social intelligence from the perspective of optimising labour market pricing. *Economics, Entrepreneurship, Management*, 10(2), 48-55. doi: 10.56318/eem2023.02.048.

\*Corresponding author



Copyright © The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

Social intelligence (SI), which is a prerequisite for socialisation, is well suited to this role. It helps better navigate the basic trends and norms of social life, which is a major help in finding a job effectively.

Previous research has shown a significant impact of social intelligence on a number of aspects of life that are beneficial to individuals and society, including political, entrepreneurial and civic engagement, a sense of patriotism, and a desire to volunteer (Liadskyi *et al.*, 2022). In the labour market, which is a vital component of socio-economic relations, employees who offer their abilities as a commodity (service) and employers who offer jobs for a fee interact (Teryanik, 2015). Labour market pricing affects the relationship between these parties and considers the basic needs of the population. The determination of labour prices is an indicator of national welfare, efficiency, and stability of social and economic policy. The price of the labour product includes not only the salary paid by the employer according to the current legislation as a reward for the work performed, but various bonuses, surcharges and other forms of material incentives for employees (Danylenko & Diadyk, 2021). It may also include non-monetary components provided by the employer, such as travel to and from work, free housing, meals or cellular phone service, etc. Labour market pricing covers not only the external labour market, but the internal labour market within the enterprise, and it is important to consider trends in different segments of these markets and each production factor. The mechanism of price formation in the labour market is to determine its size at different stages – from employment and the production process, from the resource to the production stage.

A person's financial well-being is linked to many factors. One of them is social intelligence (Shrama, 2019). The nature of this concept has not yet been fully explored by scientists. It is believed that Edward Lee Thorndike first used the term "social intelligence" in 1920 in his publication (Develi *et al.*, 2022). Due to the fact that it was published in the non-scientific publication "*Harper's Journal*", some researchers attribute the role of the author of "social intelligence" to the scientist Harry Barnes, whose monograph used the term in 1926. The authorship is also attributed to John Dewey, whose research interests covered SI as early as 1909, or Lull Herbert Galen, who used the term "social intelligence" in his 1911 publication (Mateyuk & Sukhodolia, 2021).

The beginning of the 20<sup>th</sup> century is marked by an increased interest of psychologists and educators in the cognitive and behavioural characteristics of the individual (Hoseini & Ashrafi, 2020). Researchers are also trying to create an effective system for testing social intelligence. The tests of J. Washington (GWIST), J. Guilford and M.O'Sullivan (Four Factor Test of Social Intelligence) and others are actively used (Gupta *et al.*, 2021). However, each of them has disadvantages, including time-consuming, difficulty in use, and low correlation.

An effective way to assess the level of social intelligence is the TROMSØ test developed by Norwegian scientists D. Silvera *et al.* (2001). They worked out three basic

components of social intelligence, namely *Social Information Processing*, *Social Skills*, and *Social Awareness*. This test consists of 21 questions that reveal the level of social intelligence of a person, without overloading the process of answering and analysing them. The TROMSØ questionnaire, due to its convenience and ease of interpretation, is the most appropriate for determining the impact of SI on a person's socially useful qualities, as well as their ambitions for a position, salary and career prospects.

From this perspective, one can assume that social intelligence is linked to other manifestations of human social behaviour, including labour market pricing. This process is not limited to the purchase and sale of labour. The wage ceiling is set based on two boundaries: the lower boundary is determined by the official minimum wage and the level below which an employee will not agree to work. In most cases, the upper limit is calculated based on marginal labour productivity and an estimate provided by the company's management. It is not profitable for the latter to pay an employee more than he or she brings in. Therefore, the combination of an employee's ambitions and an understanding of their importance to the company from the employer's standpoint forms an employment contract, which is agreed to by both parties to the process. It is probable that the level of development of a job seeker's social intelligence determines the upper limit of the salary he or she can expect, as well as its lower limit, below which employment will not take place. This assumption became the basis of the study, which was to determine the extent to which students' social competence and SI help them in career guidance and objective assessment of their own competence, the material equivalent of which can be considered a salary.

## MATERIALS AND METHODS

The survey was conducted among students of the full-time department of Poltava State Agrarian University. The total number of respondents was 102. To determine the level of social intelligence development, they were asked to answer 21 questions of the TROMSØ test. The authors of this questionnaire indicate an acceptable internal reliability of Social Information Processing = 0.81, Social Skills = 0.86, Social Awareness = 0.79 according to Cronbach's coefficient (Silvera *et al.*, 2001). Notably, due to the equivalence of each of the questions, there is no need to introduce additional coefficients when determining the level of social intelligence.

The study was conducted in compliance with ethical standards for interviewing people. All survey participants were fully informed of their anonymity and the purpose of the study. Their personal data is not used in any way and does not pose any possible risks. The study was approved by the Educational Ombudsman of Poltava State Agrarian University.

Since the respondents were students, it was necessary to prepare the questionnaire in such a way as not to overburden them with the same type of questions, as well as to minimise the probability that young people would try to influence the results of the study in any way. First, the survey

was completely anonymous, so no one was concerned about making a positive impression. Secondly, the questions were presented in a scattered manner, rather than sequentially for each block, so students could not perceive a certain logical sequence of the questionnaire. Ten items in the TROMSØ questionnaire are worded in a positive context, and eleven in a negative context, which requires coding. The score ranged from 1 to 7. The first mark corresponds to the statement

“Does not describe me at all”, and the seventh mark corresponds to the statement “Describes me completely”. Interpretation of the survey results involved summing up the item scores for each factor and dividing the sum by the number of items to obtain a score. A high score indicates a person’s ability to correctly assess social situations and phenomena, and the presence of developed communication skills. The questions are listed in Table 1.

**Table 1.** List of questions for the student survey

Block 1. Processing of social information (SP)	Block 2. Social skills (SS)	Block 3. Social awareness (SA)	Additional questions regarding students’ opinions on the desired salary
1. “I can predict the behaviour of other people”.	4. “I often feel insecure around new people I do not know”.	2. “I often feel that it is difficult for me to understand other people’s choices”.	22. What salary would you be willing to work for alongside your studies, given your real capabilities?
3. “I know how my actions make other people feel”.	7. “I can easily adapt to different social situations”.	5. “Other people often surprise me with their actions”.	23. What salary do you expect to receive immediately after graduation, considering your real capabilities?
6. “The feelings of other people are clear to me”.	10. “I can quickly navigate new situations and meet new people”.	8. “People are angry with me, but I do not know why”.	24. What salary would satisfy you, considering your real capabilities?
9. “I understand the desires of other people”.	12. “I find it difficult to establish relationships with other people”.	11. “People often get angry or annoyed when I say what I think”.	
14. “I often understand what other people’s aspirations are, even when I do not ask them”.	15. “It takes me a long time to understand other people well”.	13. “I think people are unpredictable”.	
17. “I can predict how others will react to my behaviour”.	18. “I am good at choosing the right words when talking to new people”.	16. “I often offend others without realising it”.	
19. “I can often understand what other people really mean by their facial expressions, body language, and mimicry”.	20. “It is important for me to find an interesting topic for conversation”.	21. “I am often surprised by the reaction of others to what I do”.	

**Source:** compiled by the authors of the study based on D.H. Silvera *et al.* (2001)

The survey was conducted online using a questionnaire created in a Google form. Microsoft Excel was used to process the research results. To establish the relationship between the two variables, the Spearman’s Rank Correlation Coefficient was used, according to the recommendations of V.F. Bosniuk (2020), where X (independent variable) is social intelligence and its components, and Y (dependent variable) is the level of expected wages. The correlation indices were interpreted according to the recommendations of U. Turan (2020) using the Chaddock scale, which can determine the strength of the relationship between two variables: 0.1-0.3 – weak; 0.3-0.5 – noticeable; 0.5-0.7 – moderate; 0.7-0.9 – high; 0.9-1.0 – very high.

## RESULTS

Since SI and EI have a common mental nature, it is logical to assume that social intelligence also affects the amount of salary and the employee’s ambitions regarding motivation at work. Furthermore, SI is more related to planning, as it

focuses on the predictive property of the psyche, unlike EI, which mainly helps in determining current scenarios.

The students of Poltava State Agrarian University, among whom this study was conducted, showed an above-average level of social intelligence. In general, its indicator was at the level of 4.7 points. The range of possible answers was from 1 to 7 points. 21 respondents demonstrated a SI development level below 4 points. The answers of 45 students who took part in the study were within 4-5 points. The level of social intelligence of 24 people was rated from 5 to 6 points. A high overall SI level was found in 12 respondents.

As for their income ambitions, 41.2% of respondents chose to earn more than UAH 5,000 as a part-time job while studying. A similar number of students believe they can earn more than UAH 7,000. The third most popular answer, but by a wide margin, was the result of UAH 3,000 to 4,000 – 8.8% of respondents agreed to pay this amount. The range from 4,000 to 5,000 UAH was attractive for 2.9% of

students. The lowest salary of up to UAH 1,000 was agreed to by 5.9% of respondents.

The situation with salary expectations immediately after graduation is different from the previous point. The highest figure, 29.4% of respondents, expects an income of at least UAH 12,000, 23.5% plan to earn between UAH 8,000 and 1,000, and 17.6% are focused on a systematic income of more than UAH 15,000. Salary ambitions exceeding UAH 25,000 are observed in 14.7% of respondents. An income of UAH 6,000-7,000 is considered acceptable by 8.8% of students. The lowest salary ambitions are among 2.9% of respondents, who expect to earn UAH 5,300. The same percentage, namely 2.9%, of young people expect to start earning UAH 7,000-8,000.

When asked what salary respondents consider to be completely acceptable given their chosen profession and the socio-economic situation in Ukraine, their answers were distributed as follows. The majority of respondents, namely 32.4%, agreed that adequate remuneration for their work should be within UAH 15,000-20,000. Slightly fewer students plan to earn between UAH 20,000 and 30,000 in their adult lives, considering the inflation rate at the time of the survey, as evidenced by the answers of 20.6% of respondents.

The most ambitious of the respondents strive for a stable monthly income of over USD 1,000 (17.6%) and over USD 2,000 (5.9%) among the students who took part in the survey. A salary of UAH 12,000-15,000 was accepted by 11.8% of future specialists, and UAH 10,000-12,000 – by 2.9% of respondents. The lowest salary of UAH 7,000-10,000 is expected by 8.8% of students. This is quite consistent with the distribution of answers about the level of social intelligence.

Low SI scores were reported by 20% of respondents. A similar percentage of responses indicated a small salary. Specifically, 17.6% of the students surveyed agreed to low salaries during their studies, 14.6% predicted low income after graduation, and 23.5% anticipated low salaries in their future professional activities. The analysis of the relationship between social intelligence and labour market pricing showed a statistically significant ( $p \leq 0.05^*$ ) positive relationship with the expectations of income after graduation and in choosing the optimal salary (Table 2). In terms of part-time work, no significant correlation was found with the level of their social intelligence. Almost all respondents, regardless of their SI level, expressed a desire to earn as much as possible. However, they had a different view of their income ambitions after graduation and in adulthood.

**Table 2.** The impact of social intelligence on labour market pricing

TROMSØ test criterion/Labour market pricing	Salary while studying	Salary after graduation	Optimal salary	Average value
Spearman's correlation coefficient	0.218	0.418	0.349	0.212
Strength of connection on the Chaddock scale	weak, positive	noticeable, positive	noticeable, positive	weak, positive
Statistical significance of the trait dependence	$p > 0.05$	$p \leq 0.05^*$	$p \leq 0.05^*$	$p > 0.05$

**Notes:**  $p \leq 0.05$  – low statistical significance;  $p \leq 0.01$  – medium statistical significance;  $p \leq 0.001$  – high statistical significance

**Source:** compiled by the authors based on the studies conducted

People with high social intelligence scores (over 5 points) showed a stable desire for high salaries. Those respondents whose SI was not as high lowered the bar for potential income, or rather their own ambitions for it, with each subsequent question. Their average salary did not differ significantly from their wishes for a part-time job while studying. Of the three main components of social intelligence, only SP, the criterion responsible for processing social information, showed a correlation with the level of expected salary. People with a developed ability to collect the necessary data,

analyse it and extrapolate it to their own lives demonstrate better ability to predict the consequences of their actions and the actions of others. The respondents' answers revealed a significant moderate positive correlation between SP and expected earnings after graduation ( $p \leq 0.01^{**}$ ) and a significant positive impact of this indicator on salary ambitions in adult life ( $p \leq 0.05^*$ ), as presented in Table 3. Thus, the high level of development of the ideological component of intellectual activity leads to the desire for career growth and professional success, which is reflected in the corresponding salary.

**Table 3.** The impact of social information processing on labour market pricing

TROMSØ test criterion/Labour market pricing	Salary while studying	Salary after graduation	Optimal salary	Average value
Spearman's correlation coefficient	0.272	0.577	0.390	0.421
Strength of connection on the Chaddock scale	weak, positive	moderate, positive	noticeable, positive	noticeable, positive
Statistical significance of the trait dependence	$p > 0.05$	$p \leq 0.01^{**}$	$p \leq 0.05^*$	$p \leq 0.05^*$

**Notes:**  $p \leq 0.05$  – low statistical significance;  $p \leq 0.01$  – medium statistical significance;  $p \leq 0.001$  – high statistical significance

**Source:** compiled by the authors based on the studies conducted

The study of the possible connection between labour market pricing and such components of social intelligence as social skills and social awareness did not reveal a significant

correlation (Table 4; Table 5). It is assumed that these qualities help in better understanding current scenarios, but do not have a predictive effect in predicting future situations.

**Table 4.** The impact of social skills on labour market pricing

TROMSØ test criterion/Labour market pricing	Salary while studying	Salary after graduation	Optimal salary	Average value
Spearman's correlation coefficient	0.203	0.310	0.193	0.216
Strength of connection on the Chaddock scale	weak, positive	noticeable, positive	noticeable, positive	weak, positive
Statistical significance of the trait dependence	p>0.05	p>0.05	p>0.05	p>0.05

**Notes:** p≤0.05 – low statistical significance; p≤0.01 – medium statistical significance; p≤0.001 – high statistical significance

**Source:** compiled by the authors based on the studies conducted

**Table 5.** The impact of social awareness on labour market pricing

TROMSØ test criterion/Labour market pricing	Salary while studying	Salary after graduation	Optimal salary	Average value
Spearman's correlation coefficient	0.184	0.261	0.275	0.212
Strength of connection on the Chaddock scale	weak, positive	noticeable, positive	noticeable, positive	weak, positive
Statistical significance of the trait dependence	p>0.05	p>0.05	p>0.05	p>0.05

**Notes:** p≤0.05 – low statistical significance; p≤0.01 – medium statistical significance; p≤0.001 – high statistical significance

**Source:** compiled by the authors based on the studies conducted

The interpretation of the respondents' survey results showed that social intelligence has a significant impact on many socially important aspects of life. Apart from the desire for self-development, political and civic awareness, a tendency to volunteer and a sense of patriotism, SI is significantly correlated with a person's career guidance behaviour, labour market pricing, and salary ambitions. Since financial well-being is a vital component of life success, raising the level of social intelligence of young people is of great importance in the context of strengthening the economic, political and social security of the country. Further research on this psychological phenomenon will help to better understand the nature of professional success and effective socialisation.

## DISCUSSION

The connection between social intelligence and a person's success in the labour market is a subject of thorough research. In this context, it is relevant to note that SI is closely related to another soft-skill, namely emotional intelligence (EI), which is much better researched. A study of the impact of emotional intelligence on wages among Americans found that employees with higher levels of emotional intelligence earn an average of USD 29 thousand more per year than people with lower levels (Rybalka & Yakunin, 2018). This was explained by an increase in labour productivity. Another study conducted on a sample of 785 people showed that identifying the level of emotional intelligence development can predict professional success, one of the most important criteria of which is salary (Sanchez-Gomez *et al.*, 2021). Analogous conclusions were reached by T. Momm *et al.* (2015), who compared emotional literacy and social influence on annual income. The study of

a sample of 142 employee-peer-manager triads found that the ability to recognise emotions correlates with the level of annual earnings. The authors interpreted these results as the respondents' communication skills. It is assumed that developed emotional abilities allow people not only to process information efficiently, but to use it for effective orientation in the social environment of organisations, which contributes to their success.

Pricing in the labour market demonstrates, among other things, a person's self-respect and assessment of their own capabilities and professional abilities. As a rule, higher salaries are planned by people who are inclined to self-development and personal growth. The study by I. Liadskyi & D. Diachkov (2022) clearly demonstrated the impact of social intelligence on the interest in additional knowledge, skills and abilities, which further explains its impact on labour market pricing. No significant gender difference was found between social intelligence and salary ambitions. This is confirmed by other studies that also show approximately equal development of SI and professional or initial academic performance (Bhat, 2016). This soft skill, along with related emotional intelligence, is becoming an even more important skill in today's digital world, which is dramatically changing the labour market. Specifically, the digital trends of 2021-2022 were also driven by the COVID-19 pandemic, which has dramatically changed the face of the labour market. Social intelligence has also had a certain impact (Starynska & Spivak, 2021), defining innovative approaches to the formation of labour relations, in particular in the search for remote work or part-time work.

It was proved that managers and employees with developed emotional intelligence are more efficient, creative and make better decisions, which significantly optimises their

work (Bonesso *et al.*, 2019). H. Lyubochkina's (2017) study also points to the creativity of employees characterised by a prominent level of social intelligence. Furthermore, the psychologist points out that people have a better understanding of themselves when their SI is well developed. In other words, by understanding their own motives and goals, it is easier for an employee to determine a decent level of remuneration and its adequacy to their efforts. These findings are consistent with research conducted among students at the Poltava State Agrarian University, which indicates greater awareness and self-awareness about socially relevant issues, including the importance of a salary in meeting basic and essential needs. People with developed social intelligence are better integrated into the labour relations system, tend to work in a team and perform common tasks. This is evidenced by the results of a study by J. Freeman *et al.* (2020). According to the specified study, these people can expect better pay and loyalty from their team and management. According to the results of the student survey, this impact is exerted by social information processing, which allows for effective analysis and use of social information, being guided by the realities of the labour market.

In general, the topic of financial motivation is closely related to the level of employees' expectations regarding remuneration and their sense of gratitude. The research by L. Gulliford *et al.* (2019) shows that social intelligence determines a person's self-control and gratitude, which harmoniously complements the results of the survey of students at Poltava State Agrarian University. This aspect further explains the need to analyse the SI of job applicants to understand their ability to work in a team and to appreciate motivation, including in financial terms. A prominent level of social intelligence reduces conflict in the team, minimises market pricing, and minimises destructive forms of demonstrating disagreement with managers and employees (Rahim *et al.*, 2018). Accordingly, this soft skill helps to reduce tension among staff, including in the area of labour market pricing. Other researchers, including S.J. Obot (2021), who came to this conclusion based on the responses of 305 respondents from secondary education institutions, also advise developing the social intelligence of employees. In Obot's opinion, staff with developed SI are better capable of managing their personal and professional

lives and perform their duties more effectively in communicating with other people.

Thus, these studies conclude that social intelligence affects labour market pricing. People with a higher level of social intelligence have higher salaries and better opportunities for development. They are also better equipped to adjust to the digital world and operate more productively in teams.

## CONCLUSIONS

This paper covered a statistically significant impact of social intelligence on the pricing of salaries. This dependence is especially evident in the case of the social information processing component, which demonstrated a moderate positive relationship ( $p \leq 0.01^{**}$ ) with immediate post-graduation salary expectations. On average, respondents expressed a desire to receive UAH 12.6 thousand. However, no correlation was found between social intelligence or its components and ambitions for the level of pay during study. Students demonstrated their willingness to work extra hard for any financial motivation. As for the level of salary that would fully satisfy them in adulthood, the average salary level is about UAH 21,600 (USD 580). A significant positive correlation ( $p \leq 0.05^*$ ) with this indicator was demonstrated by such a component of social intelligence as social information processing. The study revealed a tendency for social intelligence to influence labour market pricing, but further research on large samples of not only students but also adults seeking employment is needed to confirm this.

## ACKNOWLEDGEMENTS

The authors of this study would sincerely like to acknowledge their colleagues for the organisation and of an holding the survey among the students:

1. Dmytro Diachkov, Doctor of Economics, Professor, Professor of I.A. Markina Department of Management, Poltava State Agrarian University;

2. Oleksandr Pomaz, PhD in Economics, Associate Professor of I.A. Markina Department of Management, Ombudsman of the Educational Process Participants of Poltava State Agrarian University.

## CONFLICT OF INTEREST

None.

## REFERENCES

- [1] Bhat, Y.I. (2016). Social intelligence, study habits and academic achievements of college students of district Pulwama. *Research on Humanities and Social Sciences*, 6(7), 35-41. Retrieved from <https://core.ac.uk/download/pdf/234675009.pdf>.
- [2] Bonesso, S., Bruni, E., & Gerli, F. (2019). Emotional and social intelligence competencies in the digital era. In *Behavioral competencies of digital professionals* (pp. 41-62). California: Palgrave Pivot Cham.
- [3] Bosniuk, V. (2020). *Mathematical methods in psychology: A course of lectures*. Kharkiv: National University of Civil Defense of Ukraine.
- [4] Danylenko, V., & Diadyk, T. (2021). Trends of labor market development of Poltava region. *Economics and Organization of Management*, 3(43), 147-156. doi: 10.31558/2307-2318.2021.3.14.
- [5] Develi, A., Pekkan, N.U., & Cavus, M.F. (2022). Social intelligence at work and its implication for organizational identification: A sectoral comparison. *Independent Journal of Management & Production*, 13, 364-383. doi: 10.14807/ijmp.v13i1.1555.

- [6] Freeman, J., Baggio, J.A., & Coyle, T.R. (2020). Social and general intelligence improves collective action in a common pool resource system. *Proceedings of the National Academy of Sciences*, 117(14), 7712-7718. doi: [10.1073/pnas.1915824117](https://doi.org/10.1073/pnas.1915824117).
- [7] Gulliford, L., Morgan, B., Hemming, E., & Abbott, J. (2019). Gratitude, self-monitoring and social intelligence: A prosocial relationship? *Current Psychology*, 38(7), 1021-1032. doi: [10.1007/s12144-019-00330-w](https://doi.org/10.1007/s12144-019-00330-w).
- [8] Gupta, S., De, M.M., & Sinha, S. (2021). Theoretical architecture of social intelligence. *International Journal of Emerging Technologies and Innovative Research*, 8(5), 525-534. Retrieved from <https://www.jetir.org/papers/JETIR2105198.pdf>.
- [9] Hoseini, S.A., & Ashrafi, B. (2020). The effect of social intelligence on career plateau reduction with the mediating role of psychological capital. *Revista Conrado*, 16(77), 475-482. Retrieved from <http://scielo.sld.cu/pdf/rc/v16n77/1990-8644-rc-16-77-475.pdf>.
- [10] Liadskyi, I., Kononets, N., & Senko, I. (2022) Management of social intelligence in the context of developing citizen's patriotism. *Economics, Entrepreneurship, Management*, 9, 44-52. doi: [10.56318/eem2022.02.044](https://doi.org/10.56318/eem2022.02.044).
- [11] Liadskyi, I., & Diachkov, D. (2022). Management of social intelligence as a factor of influence on the formation of soft-skills in higher education students. *Tavriysky Scientific Bulletin*, 13, 108-114. Retrieved from <https://www.researchgate.net/publication/365222618>.
- [12] Lyubochkina, H. (2017). Understanding social intelligence in science. *Bulletin of Lviv Polytechnic National University*, 884, 52-58. Retrieved from <https://science.lpnu.ua/sites/default/files/journal-paper/2018/jun/13302/10.pdf>.
- [13] Mateyuk, O., & Sukhodolia, Y. (2021). Social intelligence: Psychological phenomenon and theoretical problem. *Visnyk of the Lviv University. Series Psychological Sciences*, 11, 113-123. doi: [10.30970/PS.2021.11.15](https://doi.org/10.30970/PS.2021.11.15).
- [14] Momm, T., Blickele, G., Liu, Y., Wihler, A., Kholin, M., & Menges, J.I. (2015). It pays to have an eye for emotions: Emotion recognition ability indirectly predicts annual income. *The Journal of Organization Behavior*, 36, 147-163. doi: [10.1002/job.1975](https://doi.org/10.1002/job.1975).
- [15] Obot, S.J. (2021). Emotional and social intelligence: A gateway to organizational effectiveness. *International Journal of Research and Innovation in Social Science*, 5(9), 857-862. Retrieved from <https://www.rsisinternational.org/journals/ijriss/Digital-Library/volume-5-issue-9/857-862.pdf>.
- [16] Rahim, A., Civelek, I., & Liang, F.H. (2018). A process model of social intelligence and problem-solving style for conflict management. *International Journal of Conflict Management*, 29(4), 487-499. doi: [10.1108/IJCM-06-2017-0055](https://doi.org/10.1108/IJCM-06-2017-0055).
- [17] Rybalka, A., & Yakunin, A. (2018). The increase of labour productivity for the account of emotional intelligence of employees. *Priazovsky Economic Bulletin*, 6(11), 279-284. Retrieved from [http://pev.kpu.zp.ua/journals/2018/6\\_11\\_uk/52.pdf](http://pev.kpu.zp.ua/journals/2018/6_11_uk/52.pdf).
- [18] Sanchez-Gomez, M., Bresó, E., & Giorgi, G. (2021). Could emotional intelligence ability predict salary? A Cross-Sectional Study in a Multioccupational Sample. *International Journal of Environmental Research and Public Health*, 18(3), 1322. doi: [10.3390/2Fijerph18031322](https://doi.org/10.3390/2Fijerph18031322).
- [19] Shrama, N. (2019). A correlational study of social intelligence and well-being. *International Journal of Engineering Science and Computing*, 9(4), 21135-21138. Retrieved from [https://ijesc.org/upload/20cf92b3deb17447170857c31e2d4afb.A%20Correlational%20Study%20of%20Social%20Intelligence%20and%20Well-Being%20\(1\).pdf](https://ijesc.org/upload/20cf92b3deb17447170857c31e2d4afb.A%20Correlational%20Study%20of%20Social%20Intelligence%20and%20Well-Being%20(1).pdf).
- [20] Silvera, D.H., Martinussen, M., & Dahl, T.I. (2001). The TROMSØ social intelligence scale, a self-report measure of social intelligence. *Scandinavian Journal of Psychology*, 42(4), 313-319. doi: [10.1111/1467-9450.00242](https://doi.org/10.1111/1467-9450.00242).
- [21] Starynska, O., & Spivak, L. (2021). Features of social intelligence of students of higher education institutions during quarantine restrictions. *Psychological Journal*, 7(10), 7-16. doi: [10.31108/1.2021.7.10.1](https://doi.org/10.31108/1.2021.7.10.1).
- [22] Teryanik, E. (2015). The analysis of the supply and demand in the labor market in Ukraine. *State and Regions. Series: Economics and Business*, 1(82), 62-68. Retrieved from [http://www.econom.stateandregions.zp.ua/journal/2015/1\\_2015/13.pdf](http://www.econom.stateandregions.zp.ua/journal/2015/1_2015/13.pdf).
- [23] Turan, U. (2020). A correlation coefficients analysis on innovative sustainable development groups. *EUREKA: Social and Humanities*, 1, 46-55. doi: [10.21303/2504-5571.2020.001130](https://doi.org/10.21303/2504-5571.2020.001130).

### **Ігор Костянтинович Лядський**

Кандидат сільськогосподарських наук, старший викладач  
Полтавський державний аграрний університет  
36000, вул. Сковороди, 1/3, м. Полтава, Україна  
<https://orcid.org/0000-0001-6431-973X>

### **Тетяна Василівна Дядик**

Кандидат економічних наук, доцент  
Полтавський державний аграрний університет  
36000, вул. Сковороди, 1/3, м. Полтава, Україна  
<https://orcid.org/0000-0002-8422-3775>

## **Управління соціальним інтелектом з позицій оптимізації ціноутворення на ринку праці**

**Анотація.** Питання об'єктивної оцінки майбутнім працівником вартості своєї роботи є актуальною проблемою для кожного студента чи випускника закладу вищої освіти, оскільки молоді люди часто або значно завищують свої очікування щодо заробітної плати та просто не можуть надати послуги відповідної якості, або, навпаки, беруться за низькооплачувану роботу та починають емоційно вигоряти, оскільки не отримують належної мотивації. Метою дослідження було виявити наскільки студентська молодь з розвиненим соціальним інтелектом оцінює свої перспективи заробітку під час навчання, у перші роки після випуску та у дорослому житті. Для цього проводилося опитування студентів з використанням тесту TROMSØ та спеціально розроблених питань, що допомогли виявити суб'єктивну оцінку респондентами вартості свого робочого часу. Дослідження виявило статистично значимий зв'язок соціального інтелекту з ціноутворенням на ринку праці. Особливо яскраво ця залежність прослідковується з очікуваннями заробітної плати одразу після випуску ( $p \leq 0,01^{**}$ ). Проте не виявлено кореляції між соціальним інтелектом чи його компонентами та амбіціями щодо рівня оплати під час навчання. Було встановлено, що студенти ладні шукати підробіток за будь-яку фінансову мотивацію. Щодо побажань відносно рівня заробітної плати, який цілковито задовільнить їх уже в дорослому віці, то в середньому її рівень втричі перевершує розмір мінімальної заробітної плати по Україні та дорівнює 580 USD. Розуміючи рівень розвитку соціального інтелекту людини, можна побудувати ефективну систему найму, отримавши додатковий інструмент для оцінки можливих амбіцій щодо заробітної плати. Завдяки цьому вдасться оптимізувати роботу кадрової служби та розуміти діапазон фінансової мотивації, необхідної для стимулювання конкретного працівника

**Ключові слова:** соціальна компетентність; працевлаштування; профорієнтація; soft-skills; HR-маркетинг; робоча сила; заробітна плата

# **ЕКОНОМІКА, ПІДПРИЄМНИЦТВО, МЕНЕДЖМЕНТ**

*Міжнародний економічний журнал*

**Том 10, № 2(20), 2023**

Заснований у 2014 р. Виходить два рази на рік

**Літературний редактор:**

Д. Чохленко

**Редагування англomовних текстів:**

С. Воровський, К. Касьянов

**Комп'ютерне верстання:**

М. Кришталь

Видавництво Львівської політехніки

79013, вул. Ф. Колесси, 4, м. Львів, Україна

Реєстраційне свідоцтво серії КВ № 25121-15061 ПР від 07 червня 2022 р.

Формат 60\*84/8. Друк офсетний. Умовн. друк. арк. 6,7. Наклад 50 прим. Зам. 230451

**ECONOMICS, ENTREPRENEURSHIP, MANAGEMENT**

*International Economic Journal*

**Volume 10, Issue 2(20), 2023**

Founded in 2014. Published 2 times per year

**Literary editor:**

D. Chokhlenko

**Editing English-language texts:**

S. Vorovsky, K. Kasianov

**Desktop publishing:**

M. Kryshchal

Lviv Polytechnic Publishing House

79013, 4 Kolessa Str., Lviv, Ukraine

Certificate of state registration series KV No. 25121-15061 PR of June 07, 2022  
Format 60\*84/8. Conventional printed pages 6.7. Circulation 50 copies. Order 230451