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THE ROLE OF DATA ANALYTICS IN MAKING MANAGEMENT DECISIONS BY THE LOGISTICS INTERMEDIARIES

ABSTRACT

Data analytics plays a crucial role in increasing the effectiveness of management decisions by the logistics of intermediaries. The aim of the article is to identify the extent to which the quality of data analytics affects the effectiveness of decision-making in the logistics intermediaries, in particular, the speed of delivery of the studied companies.

The study employed regression and correlation analysis to identify key influencing factors in terms of data analytics on the effectiveness of management decisions of the logistics intermediaries. The significance of investment in the qualification of analysts (with a coefficient of -1.6754), analytical tools (with a coefficient of -1.2575), and integration of analytics in decision-making processes (with a coefficient of -3.2511) directly affect the reduction of delivery time.

It is emphasized that each analytical project contributes to the reduction of delivery time by 0.48 hours. Correlation analysis confirmed the relationship between the efficiency of logistics and the level of qualification of analysts (-0.283617), investment in analytical tools (-0.257322), the number of analytical projects (-0.343792), the level of integration of analytics (-0.712058). The strongest correlation was observed for the integration of analytics in management decision-making.

It is recommended to focus on the development of analytical competencies, increase of investment in tools, intensification of projects, and integration of analytics in strategic management. Further research is planned on the use of artificial intelligence to optimize management decisions in logistics as part of ensuring the company's sustainable development.

Keywords: data analytics, big data, artificial intelligence, efficiency, speed of delivery

JEL Classification: M11

INTRODUCTION

In the current business context of continuous growth of data volumes, the ability to analyse and use this data becomes a decisive factor for success in many areas, in particular for the logistics intermediaries. Data analytics becomes not just a tool for identifying trends and patterns, but the key to making informed management decisions that can significantly increase efficiency, as well as reduce costs and optimize processes in the supply chain. Intermediation in logistics faces different challenges, including the need for accurate demand forecasting, inventory management, optimization of delivery routes, reduction of logistics costs, making forecasts, increasing customer satisfaction, and ensuring the sustainable development of companies. Accordingly, there is an urgent task to consider the key aspects of the application of data analytics in management decision-making in logistics intermediaries. Separate focus is the evaluation of the effectiveness of analytical methods, as well as tools for data processing and analysis.

LITERATURE REVIEW

A number of studies determine the leading role of data analytics in supporting the effectiveness of management decisions in logistics. The studies deal with innovative approaches in the field of supply chain management and reverse logistics. Jahani et al. (2023) review big data analysis methods applied in supply chain and logistics studies. Shokouhyar et al. (2021) propose a hybrid approach to modelling consumer-oriented mobile phone reverse logistics using social network data. Xiang and Xu (2019) analyse dynamic collaboration strategies in closed supply chains involving Internet service platforms. Zhu et al. (2019) developed an improved hybrid machine learning approach for credit risk forecasting of small and medium-sized businesses (SMBs) in supply chain financing. Gomes et al. (2023) study logistics management in e-commerce as part of a strategy aimed at improving efficiency and satisfying consumer needs. Lyu et al. (2023) discuss how digital technologies contribute to sustainability in container logistics chains.

Gumzej (2022) analyses the application of intelligent logistics systems in e-commerce and transportation. Lee et al. (2023) applies the Data Envelopment Analysis model to evaluate the performance of logistics companies. Jeong et al. (2023) focus on digitization in manufacturing logistics and consider how artificial intelligence, digital twins and simulations are facilitating the transition from model-driven to data-driven approaches. Özmen and Aydoğan (2019) present a multi-criteria decision-making methodology for a real problem of logistics centre location selection. Giusti et al. (2019) provide an overview of the key success factors and technologies contributing to the implementation of the synchromodal logistics model. Hawking (2018) studies the use of big data analytics and the Internet of Things (IoT) in logistics. Buntak et al. (2019) examine the role of IoT in the transformation of warehouse operations, turning them into smart warehouses. Feng and Ye (2021) offer a systemic perspective on operations management issues in smart logistics. He et al. (2022) investigates the use of business analytics in the field of smart urban transport and logistics. Rathor et al. (2022) focus on using the latest supply chain management practices and big data analytics to manage shipment content.

Prokopenko et al. (2022) focus on the economic aspects of the use of electric vehicles in delivery services in Estonia. Agarwal et al. (2023) study the application of big data analytics for supply chain optimization. Xiao and Jiao (2023) analyse the impact of big data and artificial intelligence (AI) technologies on supply chain management. These technologies not only simplify data collection and analysis, but also improve demand forecasting, inventory management, and customer interaction. Barzizza et al. (2023) focus on the role of big data analytics and machine learning in the implementation of the concept of Supply Chain 4.0. Pulikottil et al. (2023) deal with the lifecycle of big data in manufacturing enterprises, while trends and challenges are considered separately.

However, the effectiveness of management decisions in logistics in terms of the reduction of delivery time under the influence of the quality of the data analytics system in logistics intermediaries requires a more detailed study.

AIMS AND OBJECTIVES

The aim of the article is to determine the impact of the quality of data analytics on the effectiveness of management decisions of the logistics intermediaries in the context of the speed of delivery among the studied companies. The aim involves the fulfilment of the following research objectives:

1. Analyse the state of the data analytics in the logistics system in the studied companies;

2. Conduct a regression analysis in combination with other economic and statistical methods to identify the relationship between the quality of data analytics and the effectiveness of management decisions in the studied companies;

3. Analyse the impact of key technological decisions in data analytics on the effectiveness of management decisions in the logistics of the studied companies.

METHODS

Methodology

Research Design

The initial step is collecting data on the state of data analytics and their impact on the effectiveness of management decisions of the logistics intermediaries for further processing in this study. The second stage of the research involves studying the main areas of application of data analytics and related technologies by the studied companies to increase the effectiveness of their management decisions in logistics. The method of regression and correlation analysis was used to

determine the key factors of influence in terms of data analytics on the effectiveness of management decisions in the logistics of the studied companies. The impact of data analytics on the reduction of delivery time as a key manifestation of the effectiveness of the management decisions in the logistics of the studied companies was evaluated. The final stage of the study involves the identification of limitations using the methods selected for this study and the implementation of the results of this study, as well as drawing conclusions.

Sample

The studied logistics intermediaries are described below. The sample size is 150 observations of variables across digital marketing campaigns for 30 brokerage logistics companies randomly selected from the Transport Topics 2023 Top 100 Logistics Companies (2024). This sample size is sufficient for regression analysis using the linear regression method. Table 1 presents the structure of the sample by analysed companies.

Table 1. Companies of the retail sector from the studied sample population.

Company	Revenue 2023, USD million	Country
C.H. Robinson Worldwide	3001	USA
Expeditors International of Washington	2996	USA
Kuehne + Nagel International	1564	USA
UPS Supply Chain Solutions	984	USA
J.B. Hunt Transport Services	1002	USA
Ryder Supply Chain Solutions	2031	USA
DHL Supply Chain	873	Germany
XPO Logistics	905	USA
TQL	1790	USA
Coyote Logistics	2990	USA
Landstar System	4699	USA
Schneider Logistics	4433	USA
Penske Logistics	4400	USA
Echo Global Logistics	4201	USA
Lineage Logistics	4005	USA
NFI Logistics	3903	USA
Mode Global	3465	USA
Maersk Logistics	3050	Denmark
Geodis	2900	France
Ascent Global Logistics	2660	USA
AIT Worldwide Logistics	2566	USA
FedEx Logistics	2550	USA
Arrive Logistics	2350	USA
Americold Logistics	2300	USA
Kerry Logistics	2289	Hong Kong
Werner Enterprises	2257	USA
ArcBest	2140	USA
Burris Logistics	2140	USA
Knight-Swift Transportation	2125	USA
Omni Logistics	2220	USA

We will describe the procedure for forming the researched sample population. The data collection process for the model, which analyses the impact of data analytics on the effectiveness of management decisions in logistics, includes several key stages:

1. *Defining data requirements:*

- Dependent variable: delivery time (hours);
- Independent variables: level of qualification of data analysts; investments in data analytics tools; number of analytical projects; the level of integration of data analytics into logistics management solutions;

▪ Data collection period: 2023-2024.

2. *Data collection:*

▪ Data analytics systems: data collection using data analytics tools (SAP Business Network for Logistics, Oracle Logistics Cloud, IBM Sterling Supply Chain Insights with Watson) to collect data on delivery time and the state of data analytics systems of the studied companies;

3. *Data preparation and cleaning:*

▪ Check for completeness: the selected research methods were used to make sure that the data were collected for the entire specified period.

▪ Check for accuracy: the errors are corrected, and duplicates are removed.

▪ Data formatting: data formats and numerical values have been unified to ensure consistency.

4. *Data integration and structuring:*

▪ Data integration: merging data from different sources into a single database.

▪ Data structuring: creating a data structure convenient for analysis.

5. Ensuring confidentiality

▪ Data anonymization: ensuring the confidentiality of collected data in terms of commercial secrets and personal information of clients.

Methods

The set aim and research objectives envisage the use of a number of methods for analysing the role of data analytics in making management decisions in logistics, which is based on a combined methodological approach involving the use of both quantitative and qualitative research methods to provide a deeper understanding of the role of data analytics in management decisions made by logistics intermediaries. The proposed methodological approach includes the following methods:

▪ *Regression analysis* is applied to assess the influence of independent variables (quality indicators of data analytics) on dependent variables (an indicator of the effectiveness of management decisions). The results of the regression analysis will indicate the most important factors influencing the effectiveness of management decisions in logistics in terms of the quality of data analytics.

▪ *Correlation analysis* is applied to identify the connections between the quality of data analytics and the management decisions in logistics. The results of the correlation analysis reveal not only the correlation itself but also the strength of the correlation between the variables, which indicates the significance of the impact of the quality of data analytics on management decisions in logistics.

▪ *Descriptive statistics* studies the distribution of data, including mean, median, standard deviation, and minimum and maximum values for each quantitative variable in the context of a model of the impact of data analytics on managerial decision-making in logistics. The results of the analysis of descriptive statistics provide a deeper understanding of the influence of the independent variable (the effectiveness of management decisions in logistics) on the dependent variable (the effectiveness of management decisions) in the context of the sample structure of the studied companies.

▪ *The time series analysis method* identifies trends and regularities in the application of data analytics in management decision-making in logistics. This involves the collection and analysis of data on the quality of data analytics and indicators of the effectiveness of management decisions in logistics. The results of the time series analysis were further used to identify trends, and seasonal influences on changes in the level over time in terms of the effectiveness of management decisions in the logistics of the studied companies.

▪ *Content analysis and thematic analysis* were used to process interview data and document analysis to identify key themes, challenges, and relationships in the context of regression analysis. These methods enable the processing and interpretation of qualitative data obtained as a result of the analysis of the impact of the quality of data analytics on the effectiveness of management decisions in logistics.

The dependent variable is Effectiveness (delivery time), which represents delivery time as the main manifestation of the quality of management decisions in logistics, measured in hours. Independent variables are presented as follows:

▪ Qualification Level: analyst qualification level (from 1 to 10, where 10 is the highest qualification level);

▪ Investment Tools: investment in analytical tools (USD million);

- Analytical Projects: the number of completed analytical projects in logistics per year (units);
- Integration Level: level of integration of analytics in management decision-making (from 1 to 10, where 10 is full integration).

Table 1 presents the variables for the model. The studied variables are selected based on previous studies by Jahani et al. (2023), McKinsey & Company (2023), Shokouhyar et al. (2021), Xiang and Hu (2019), Zhu et al. (2019).

Table 2. Regression model variables.

Variable	Comment
Effectiveness	Time for delivery, hours
Qualification Level	Analyst qualification level (from 1 to 10, where 10 is the highest qualification level), points
Investment Tools	Investment in analytical tools, USD million
Analytical Projects	Number of completed analytical projects in logistics per year, units
Integration Level	Level of integration of analytics in management decision-making (from 1 to 10, where 10 is full integration), points

This study used Microsoft Excel and R software packages to analyse sample data. This research has limitations as the model may not take into account certain exogenous elements that affect the working environment of the studied companies. The identified limitations were eliminated by regularly checking and updating the data by updating the dataset and analysing the external context of the company's activities.

RESULTS

Regression analysis showed the following results:

- The coefficient for analyst qualification level (Qualification Level) is -1.6754 with a standard error of 0.291, which is statistically significant. This shows that with each point of increase in skill level, the delivery time decreases by 1.67 hours;
- The coefficient for investment in analytical tools (Investment Tools) is -1.2575 with a standard error of 0.246, which is also statistically significant. According to each additional USD million invested in analytical tools, delivery time is reduced by 1.25 hours;
- The coefficient for the number of completed analytical projects in logistics (Analytical Projects) is -0.4821 with a standard error of 0.151, which is also statistically significant. This indicates a reduction in delivery time of 0.48 hours with each additional analytic project implemented;
- The coefficient for the integration rate of analytics in management decision-making (Integration Level) is -3.2511 with a standard error of 0.278. The delivery time was reduced by 3.25 hours by each point of increase in the integration rate.

The overall ability of the model to explain the variation in delivery time (R-squared) is 0.882, which indicates the high quality of the model in terms of the ability to predict delivery time based on the identified factors. The studied regression model can be presented in the form of the following regression equation:

Effectiveness = 45.5042 – 1.6754 × Qualification Level – 1.2575 × Investment Tools – 0.4821 × Analytical Projects – 3.2511 × Integration Level

This regression equation demonstrates how delivery time varies depending on the level of analyst skill, investment in analytical tools, the number of analytical projects, and their integration rate into the management decision-making process. The results of the regression analysis are presented in more detail below.

- *Significance of independent variables*: all independent variables included in the model (analyst qualification level, investment in analytical tools, number of analytical projects, level of integration of analytics into management decisions) have a statistically significant effect on delivery time, which indicates their importance in the context of logistics management effectiveness;

- *Improving the state of delivery through data analytics*: the reduction of delivery time is associated with a higher analyst qualification level, greater investment in analytical tools, an increased number of analytical projects, and a higher level of integration into the management decision-making process. This emphasizes the importance of a comprehensive approach to the implementation of analytics in management decision-making in logistics;

- The significant role of qualification and integration of analytics: the integration rate of analytics into management decision-making has the greatest impact on reducing delivery time, followed by the analyst qualification level. This indicates that not only analytical knowledge and tools are important, but also their effective use and integration into the company's processes of logistics intermediation.

- *The positive role of investments in analytical tools and implementation of analytical projects*: the positive impact of investment in analytical tools and the number of analytical projects on reducing delivery time emphasizes the importance of technological and project support for analytical activities in the studied companies;

- *The high-quality regression model*: the R-squared value (0.882) indicates that the model explains well the variation in delivery time based on the selected independent variables, which indicates the high quality of the model and its suitability for predicting logistics management effectiveness.

Table 3 presents the results of descriptive statistics. The results of descriptive statistics are presented below in a more detailed analysis of mean, standard deviation, minimum, maximum and other indicators.

Table 3. Regression Analysis Results' Descriptive Statistics. *(Source: analysis of the studied sample data)*

Variable	Mean	StDev	Min	25%	Median	75%	Max
Effectiveness	7.39	10.90	2.95	0.12	5.32	12.01	31.20
Qualification Level	5.73	2.65	1.00	4.00	6.00	8.00	10.00
Investment Tools	5.30	3.11	0.83	2.28	5.57	8.10	9.71
Analytical Projects	9.57	4.99	1.00	7.00	9.00	13.00	19.00
Integration Level	5.30	2.82	1.00	3.00	5.00	7.00	10.00

The results of descriptive statistics are considered in more detail below. Effectiveness of management decisions (delivery time) – the average value of delivery time is 7.39 hours. At the same time, the standard deviation (10.90 hours) and the range of values from the minimum (-8.95 hours) to the maximum (31.20 hours) indicate a significant variability of effectiveness among companies. The standard deviation of the delivery time is quite large (10.90 hours), indicating a wide data spread. This may be explained by different logistics strategies, the geographical location of the studied companies, or the effectiveness of their management processes. Figure 1 presents the results of descriptive statistics by variable.
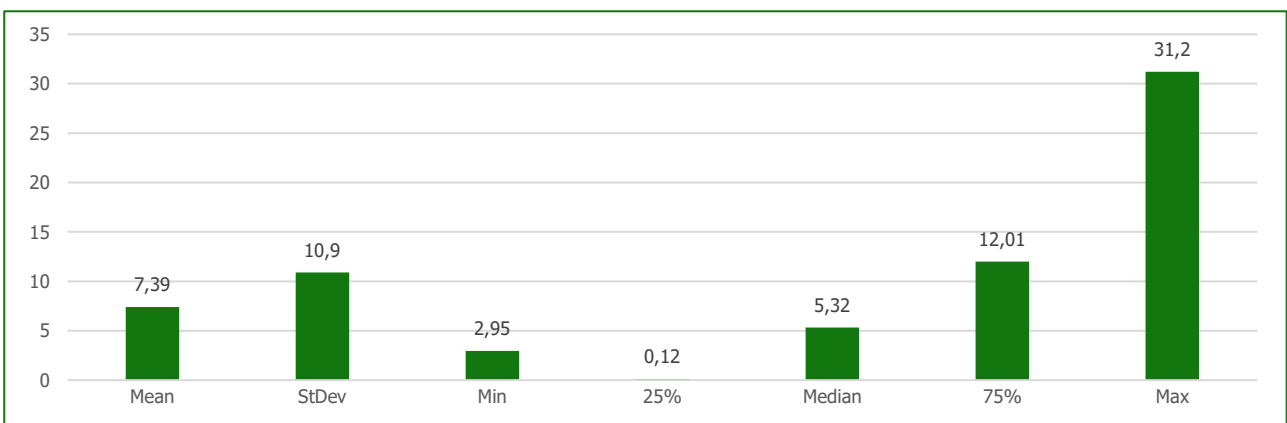

Figure 1. Descriptive statistics for dependent variable Effectiveness. *(Source: analysis of the studied sample data)*

The analyst qualification level – a range from 1 to 10 with an average value of 5.73 and a median of 6 indicates the diversity of the analyst qualification level in different companies. A sufficiently large standard deviation (2.65) confirms the diversity in the analyst qualifications. Variability in the analyst qualification level may indicate a difference in the emphasis on analytical skills between the studied companies. Most companies have a medium analyst qualification level, which may indicate the need for further investment in training and staff development to improve the effectiveness of analytics. Figure 2 presents the results of descriptive statistics by variable.
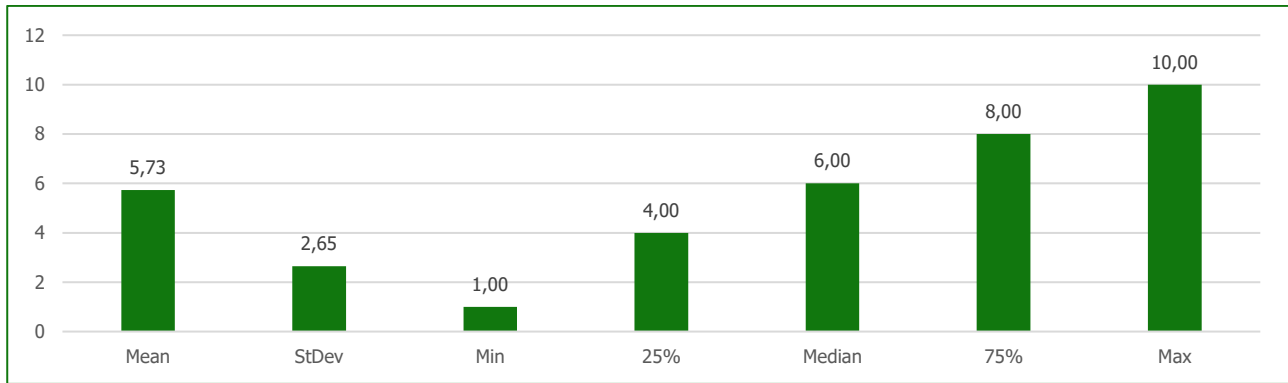
Figure 2. Descriptive statistics for independent variable qualification level. *(Source: analysis of the studied sample data)*

Investment in analytical tools — the average investment is USD 5.30 million with a relatively high standard deviation (USD 3.11 million), which indicates a significant difference in the amount of investment between the analysed companies. Accordingly, a wide range of investments is observed - investments in analytical tools vary from USD 0.83 to USD 9.71 million, indicating a significant difference in the financial capabilities or priorities of the companies. The high standard deviation confirms the significant unevenness in the levels of investment in analytical tools among the studied companies. Figure 3 presents the results of descriptive statistics by variable.
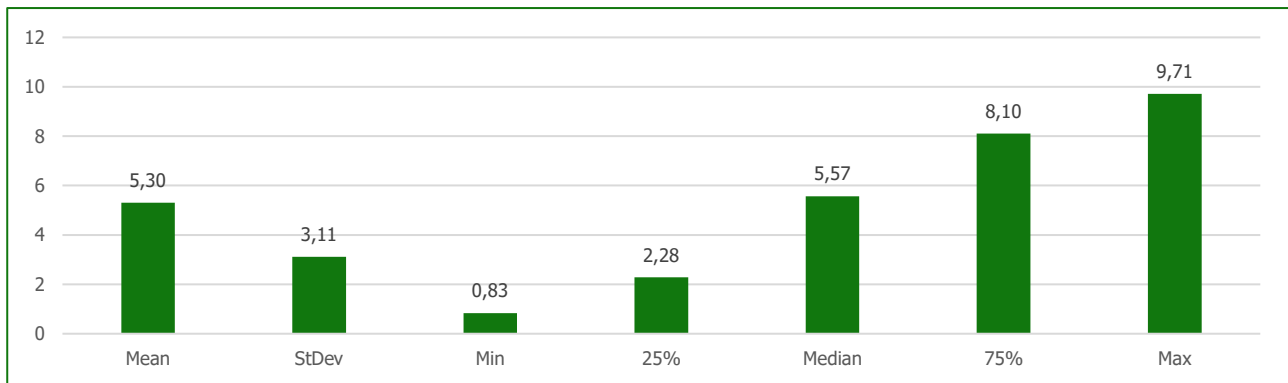

Figure 3. Descriptive statistics for independent variable investment tools. *(Source: analysis of the studied sample data)*

Number of Analytical Projects – The average number of analysis projects is 9.57 with a standard deviation of 4.99, showing a wide range in the number of projects, from one to nineteen projects per period. The average value (9.57) and the range (from 1 to 19 projects) reflect the implementation of data analytics projects by the studied companies. The variability in the number of projects may be related to the different needs for data analysis in the context of logistics management. The results of the analysis indicate an opportunity for optimization — companies with fewer projects may have the potential to increase the use of analytics in their logistics work. Figure 4 presents the results of descriptive statistics by variable.
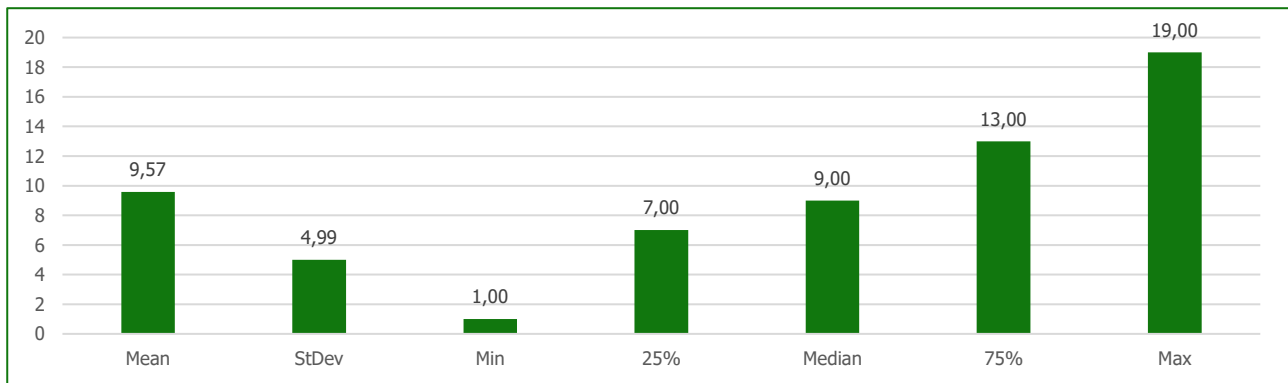

Figure 4. Descriptive statistics for independent variable analytical projects. *(Source: analysis of the studied sample data)*

The level of integration of analytics into management decisions — the variable has a mean value of 5.30 and a standard deviation of 2.82, which indicates a medium level of integration of analytics into decision-making processes in most companies, but with a significant spread of values. The results of the analysis indicate the potential for growth — the diversity in the level of integration (from 1 to 10) indicates a significant potential for improving the use of analytical data in some studied companies. Figure 5 presents the results of descriptive statistics by variable.
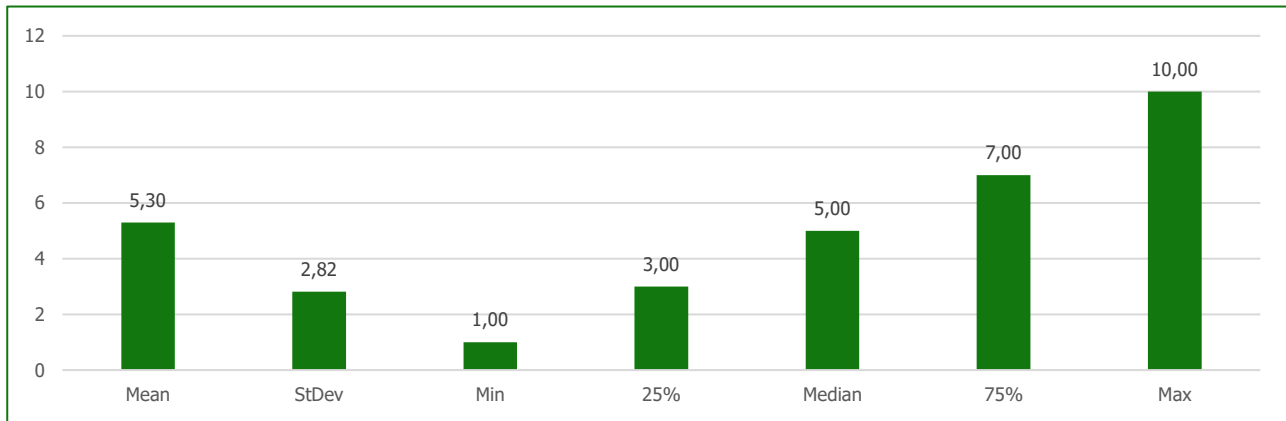

Figure 5. Descriptive statistics for independent variable integration level. *(Source: analysis of the studied sample data)*

The results of the analysis of descriptive statistics determine the overall level of effectiveness of management decisions in logistics, helping to understand the analyst qualification level, the amount of investment in analytical tools, the number of analytical projects, and the degree of integration of analytics into management. A large standard deviation in many variables indicates high variability between the studied companies, which may indicate a variety of approaches to the use of analytics in logistics processes.

Correlation analysis showed the following relationships between the dependent variable (Effectiveness) and independent variables:

- Qualification Level (analyst qualification level) and Effectiveness: the correlation is -0.283617, which indicates a negative relationship. This means that a higher level of analyst qualification is associated with a shorter delivery time;

- Investment Tools (investment in analytical tools) and Effectiveness: the correlation is -0.257322, which also indicates a negative relationship. We can interpret this result as increasing investment in analytical tools has the potential to reduce delivery time;

- Analytical Projects (number of analytical projects) and Effectiveness: the correlation is -0.343792, which is a negative relationship. Accordingly, a larger number of analytical projects can lead to a reduction in delivery time;

- Integration Level (level of integration of analytics into management decision-making) and Effectiveness: the strongest negative correlation is -0.712058. This confirms that a higher level of analytics integration is significantly associated with better performance as measured by delivery time.

The above results of the correlation analysis support the conclusions of the regression analysis. These results are additionally supported in terms of the importance of the integration of the data analytics system in the management decision-making in logistics, the qualifications of analysts, investment in analytical tools and the number of projects to improve the effectiveness of management decisions in logistics. These results can serve as a basis for developing strategies for optimizing management decisions in logistics, with a special emphasis on the development of analytical competencies, investment in analytical tools, increasing the number and quality of analytical projects, and improving the integration of analytics in logistics management.

The conducted analysis gives grounds to draw recommendations for improving the efficiency of management decisions in logistics through the implementation and integration of data analytics:

- *Upskilling of analysts*: it is important to invest company resources in training and developing a team of data analysts. Educational programmes, training and certifications can significantly improve their skills, which will directly affect the reduction of delivery time and increase the overall efficiency of management decisions in logistics;

- *Investing in analytical tools*: it is important to pay attention to providing the analytical team with modern tools and technologies that can help them to effectively collect, process, and analyse data for improving the quality of management decisions in logistics. High-quality tools increase the speed of analysis and the accuracy of the obtained conclusions;

- *Increasing the number of analytical projects*: it is appropriate to stimulate the initiation and implementation of analytical projects aimed at solving specific problems in logistics. This will allow for the identification and elimination of weak points in processes, reducing delivery time, and optimizing costs when making management decisions in logistics;

- *Full integration of analytics into the management decision-making process in logistics*: the key is to ensure close interaction of analytical units with logistics and general management units of companies. This will provide quick access to analytical conclusions and their use when making management decisions in logistics, in particular, for planning and optimizing logistics routes.

DISCUSSION

The peculiarities of the influence of data analytics on the effectiveness of management decisions in the logistics intermediaries were identified. The obtained results are considered in more detail below. The role of data analytics in the effective management of the logistics intermediaries is determined. Data analytics has a significant impact on the effectiveness of management decision-making by logistics intermediaries, especially in the context of reducing delivery times and improving the overall efficiency of logistics processes. This thesis is supported by an earlier study by Gomes et al. (2023) on the role of technology and analytics in the effectiveness of logistics processes in terms of increasing organizational efficiency and meeting customer needs. In this context, the previous work of Lyu et al. (2023) emphasizes that digital technologies, including data analytics, can help ensure the sustainability of logistics chains. It was emphasized that it is important to ensure stability in logistics with the help of innovative solutions based on analytics. Earlier work by Gumzej (2022) points to the role of intelligent logistics systems in transportation and e-commerce. The importance of smart analysis and automation of data for improving logistics operations, reducing costs, and increasing the overall efficiency of logistics companies was separately emphasized. Similarly, and Hawking (2018) emphasizes the use of big data analytics and IoT in logistics. The ways in which the integration of these technologies can significantly improve the efficiency of logistics operations are described, in particular through increasing the accuracy of forecasting, optimizing delivery routes, and automating processes.

This study describes four main drivers that influence management decisions in logistics, namely, improving data analyst qualifications, increasing investment in analytical tools, activating analytical projects in logistics, and integrating analytics into management decision-making processes. The conducted analysis confirms the positive influence of the above-mentioned factors on the reduction of delivery time, which indicates their critical importance for the efficiency of logistics operations. This thesis is supported by the earlier work of Xiao and Jiao (2023), who emphasize the impact of AI and big data technologies on supply chain management. It is emphasized separately that AI can help in adapting to market changes and making strategic decisions in logistics. In this context, Özmen and Aydoğan (2019) solved the issue of choosing the location of a logistics centre using a multi-criteria decision-making methodology.

The importance of using an integrated approach based on data analysis to make the most effective logistics decisions is emphasized. The earlier work by Feng and Ye (2021) reveals the importance of analytics in operations management in smart logistics. Key areas such as automation, digitization of supply chains, use of data in the decision-making process, and integration of IoT with other technologies to create flexible and efficient logistics systems are determined. This thesis is additionally supported by the work of Rathor et al. (2022) on shipment content management using big data analytics and modern supply chain management techniques. In this context, Agarwal et al. (2023) focus on ways to use big data analytics for supply chain optimization. It is emphasized that big data analytics can improve the efficiency of supply chains.

However, this study emphasizes the importance of a comprehensive approach for logistics intermediaries in terms of the application of decisions based on data analytics. Accordingly, it is important for companies to focus their efforts on integrating into a single system the development of analytical skills, increasing investment in technological support, intensifying the implementation of analytical projects, as well as on a deeper integration of analytics into strategic management in order to improve the efficiency of logistics management (Kniaziev et al., 2024). The proposed work emphasizes that special attention should be paid to the integration of analytics in the strategic planning and management of companies in the field of logistics. This will enable not only to identify potential opportunities and threats in advance but also to quickly adapt to

changes in the business environment and optimize logistics processes in accordance with the strategic goals of the organization. The use of analytics in a strategic context becomes especially important in the current conditions when market dynamics and technological innovations require significant flexibility and responsiveness from logistics intermediaries. So, it is vital for logistics intermediaries to adopt a comprehensive approach that combines technology support, analytical capability development, strategic management, and data integration.

CONCLUSIONS

So, the main areas of impact of data analytics on the effectiveness of management decision-making by the logistics intermediaries were identified. The complexity of this issue is determined by the widespread influence of data analytics at the current stage. Accordingly, an important issue is the establishment of specific drivers that have the greatest impact on management decisions in logistics, which should be the focus of companies. The results of the analysis showed a significant positive impact of data analytics on the efficiency of logistics process management. First, an increase in the analyst qualification level (with a coefficient of -1.6754 and a standard deviation of 0.291) leads to a decrease in delivery time by 1.68 hours with an increase in the qualification level of data analysts, which emphasizes the importance of investment in personnel development in terms of the effectiveness of management decisions in logistics Second, an increase in investment in analytical tools (with a coefficient of -1.2575 and a standard deviation of 0.246) is associated with a 1.26-hour reduction in delivery time with each additional USD million, indicating the importance of technological support. Third, an increase in the number of completed analytics projects (with a coefficient of -0.4821 and a standard deviation of 0.151) leads to a decrease in delivery time of 0.4821 hours with each project, confirming the importance of the practical application of analytics.

Therefore, an increase in the level of integration of analytics in logistics management decision-making processes (with a coefficient of -3.2511 and a standard deviation of 0.278) reduces delivery time by 3.25 hours with each additional point, indicating the critical role of analytics integration in management decision-making of logistics intermediaries. Correlation analysis confirms the relationship between the decrease in delivery time and the increase in the data analyst qualification (-0.283617), investment in analytical tools (-0.257322), the number of analytical projects (-0.343792) and the level of integration of analytics in logistics management (-0.712058), where the strongest negative correlation was found for the level of integration of analytics into management decisions in logistics, which emphasizes its crucial importance for improving the effectiveness of management decisions in the logistics of intermediary activity. Further research in this area may focus on studying the potential of using AI for data analytics as the key to the effectiveness of management decision-making by logistics intermediaries.

--- **ADDITIONAL INFORMATION** ---

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Validation: *Vali Isa Valiyev*
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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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РОЛЬ АНАЛІТИКИ ДАНИХ В УХВАЛЕННІ УПРАВЛІНСЬКИХ РІШЕНЬ У ЛОГІСТИЦІ ПОСЕРЕДНИЦЬКОЇ ДІЯЛЬНОСТІ

Аналітика даних відіграє вирішальну роль у підвищенні ефективності управлінських рішень у логістиці посередницької діяльності. Метою дослідження є ідентифікація, наскільки якість аналітики даних упливає на ефективність ухвалення рішень у логістиці посередницької діяльності, зокрема щодо швидкості доставки компаній досліджуваної вибіркової сукупності. У межах дослідження використано регресійний та кореляційний аналіз для виявлення ключових факторів впливу в розрізі аналітики даних на ефективність управлінських рішень у логістиці посередницької діяльності. Виявлено значущість інвестицій у кваліфікацію аналітиків (з коефіцієнтом -1,6754), аналітичні інструменти (з коефіцієнтом -1,2575), інтеграцію аналітики в процеси ухвалення рішень (з коефіцієнтом -3,2511), що безпосередньо впливає на скорочення часу доставки. Акцентовано, що кожний аналітичний проєкт сприяє скороченню часу доставки на 0,48 години. Кореляційний аналіз підтвердив зв'язок між ефективністю логістики та рівнем кваліфікації аналітиків (-0,283617), інвестиціями в аналітичні інструменти (-0,257322), кількістю аналітичних проєктів (-0,343792), рівнем інтеграції аналітики (-0,712058), де найсильніша кореляція спостерігалася для інтеграції аналітики у формування управлінських рішень. Автори рекомендують зосередити увагу на розвитку аналітичних компетенцій, збільшенні інвестицій в інструменти, активізації проєктів, інтеграції аналітики в стратегічне управління. Подальші дослідження передбачають використання штучного інтелекту для оптимізації управлінських рішень у логістиці в рамках забезпечення системного й сталого розвитку компанії.

Ключові слова: аналітика даних, великі дані, штучний інтелект, ефективність, швидкість доставки

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