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Methodological Approach to Assessing International Logistics Management in Commercial Activities in The Recreational Field: Innovations in Modeling

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Abstract

The main purpose of the study is to optimize the logistics systems of our chosen recreational area in the context of attracting new international tourist flows in accordance with the principles of sustainable development. The object of the study is the logistics system of our chosen recreational area - the Prague Zoo. The scientific task of the study is to determine the logical potential of the recreational zone, including indicators that influence the sustainable development of the recreational zone. The research methodology includes the use of a multivariate mathematical and statistical method. As a result of the study, a strategy for optimizing logistics systems to attract international tourists was proposed, while adhering to the principles of sustainable development. Despite this, the work has its limitations. Most of them are due to the fact that the Prague Zoo was chosen as the object of study, its commerce, logistics system and the impact of the latter on sustainable development. All these characteristics may be good for other recreational areas. The prospect of further research will be to expand the analysis of other recreational areas, and their commercial and logistics systems. In addition, further research will be aimed at more detailed development of measures to attract international tourists to recreational areas, while maintaining the implementation of the principles of sustainable development.

Keywords: *Sustainable Development, Logistics, International Tourism, Environmental Responsibility, Commercial Development, Visitor Flow Management, Methodology, Innovations.*

INTRODUCTION

The organization of logistics networks for modern recreational areas becomes important in the context of sustainable development. These areas must balance between providing quality services to visitors and minimizing their impact on the environment. The efficiency of logistics systems has a direct impact on animal welfare, visitor satisfaction and therefore the environmental impact of these areas. The commercial aspect is key, as income from international tourism can help fund sustainable practices.

Modern recreational areas use innovative logistics approaches to optimize all aspects of operations, including efficient waste management, energy conservation and sustainable use of resources. This includes the responsible use of natural resources and the creation of conditions that promote the health and well-being of animals, ensuring that they attract international visitors.

Attracting international tourists requires a clear marketing and visitor management strategy, which is especially important to maintain high levels of visitation without negatively impacting the environment. This also involves the integration of modern technologies to monitor and analyze visitor behavior and their interaction with recreational areas. Logistics systems must be flexible and adaptive to effectively respond to changing conditions and tourist needs. This includes everything from developing tour routes that reduce pressure on popular areas to optimizing operating schedules to ensure visitors are evenly distributed throughout the day.

The development of vehicles that minimize their impact on the environment, such as the use of electric buses or alternative energy vehicles, is also key. This helps reduce emissions and highlights the recreation areas' commitment to sustainability.

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In addition to technical aspects, cultural adaptation also plays an important role. Logistics systems must take into account the cultural characteristics of international tourists by organizing information materials, signage and services in accordance with their linguistic and cultural needs. Integrating logistics networks with sustainability in recreational areas requires an integrated approach that draws on environmental, commercial and cultural strategies to create a harmonious and sustainable tourism experience.

Prague Zoo is one of Europe's leading recreational areas, actively integrating sustainability principles into its logistics systems, commerce and international tourism. Zoo management is focused on creating efficient, sustainable logistics solutions that take into account the needs and welfare of animals and the expectations and welfare of visitors.

The Prague Zoo's logistics system includes several key aspects: rational use of resources, efficient waste management, innovative transport solutions and optimization of visitor flows. The zoo uses reclaimed water to maintain its water features and has installed solar panels to provide part of its energy needs, an important part of its strategy to reduce its carbon footprint.

In the area of waste management, Prague Zoo is implementing composting and recycling methods, significantly reducing the amount of waste ending up in landfills. This not only reduces the environmental impact, but serves as an example of good practice for other recreational facilities. In addition, the zoo is actively working to improve the transportation facilities serving the territory. The use of electric buses and service vehicles using alternative energy sources helps reduce emissions of harmful substances and maintains a healthy climate within the zoo (Fig.1).

Figure 1: Prague Zoo's logistics system

Source: official internet source

To optimize the flow of visitors, Prague Zoo uses advanced IT solutions to monitor and manage the movement of people, ensuring an even distribution of visitors throughout the territory. This not only improves the guest experience, but also reduces traffic congestion and minimizes stress for the animals. In the context of international tourism, Prague Zoo actively cooperates with travel agencies and online platforms to promote its services to foreign visitors. The zoo's commercial strategies include developing special tour packages that include excursions and other benefits to generate additional revenue and attract more international guests.

These initiatives at Prague Zoo demonstrate its commitment to sustainable development without sacrificing commercial benefits or international appeal. The integration of sustainable practices into all aspects of its operations demonstrates its commitment to being not only a holiday destination but also an international example of environmental responsibility.

Thus, the main goal of the study is to optimize the logistics systems of our chosen recreational area in the context of attracting new international tourist flows under the principles of sustainable development. The object of the study is the logistics system of our chosen recreational area - the Prague Zoo.

LITERATURE REVIEW

A literature review plays an important role in any research because it provides context and a basis for further analysis. Before using a specific analysis method, it is necessary to study and analyze existing literature on the chosen topic. This allows you to track previous research, identify key trends and open questions in the industry, and take a step towards understanding key challenges and opportunities. Such a review allows us to enrich our understanding of the subject area and determine the optimal approach to conducting our own research.

Moshood and Sorooshian (2021) explore the concept of the Physical Internet as a means to achieve sustainability in global logistics, which has important implications for understanding how modern technological innovation can promote sustainable development in the management of logistics systems in recreational areas such as zoos.

Gudehus and Kotzab (2012) provide a broad overview of logistics principles and practices to help understand how effective logistics management can contribute to the commercial success of recreational areas while supporting sustainability principles. At this time, Azizi et al. (2016) focus on the impact of knowledge management practices on supply chain management quality and competitive advantage. Their study highlights the importance of information flows for process optimization and efficiency gains in commercial operations, which are critical for recreational areas in the context of international tourism.

An interesting study by Miyake (2024) focuses on the role of zoos as educational resources for promoting the Sustainable Development Goals to the public. Reflecting on the Japanese experience provides valuable insight into how zoos can use their resources not only to achieve commercial success, but also for an educational mission in the context of global environmental goals.

Centobelli et al. (2017) explore environmental sustainability in the transport and logistics services sector. They conduct a systematic literature review and identify key directions for future research on environmental sustainability among transport and logistics service providers. Their findings provide valuable recommendations for improving consistency in this area, which has implications for the development of sustainable logistics systems in recreational areas.

While Monz et al. (2010) review opportunities for research in recreational ecology based on U.S. experience in managing visitation to protected areas. They discuss management strategies that minimize negative impacts on nature, which is important for developing sustainable approaches in recreational areas internationally. Wang et al. (2020) propose a method for assessing the sustainability of logistics parks using an emergence approach. Their work provides tools to better understand and manage resources in logistics operations, highlighting the importance of environmental balance in commercial logistics systems.

In his work, Dogaru (2014) reviews European jurisprudence on preserving the right to a healthy environment, which is critical for the development of sustainable practices in recreational and other areas. This work provides a legal context for understanding the responsibilities and opportunities to protect natural resources in public recreation areas. A similar study by Baldner (2018) who examines the influence of moral foundations on environmental attitudes in Italy, highlighting how cultural values influence environmental behaviour. Understanding this aspect can help formulate more effective communication and education strategies for international tourists in recreational areas.

Lan et al. (2020) analyze trends in sustainable logistics in major Chinese cities, providing insights on global practices and strategies that can be applied in other regions to improve environmental sustainability in

recreational areas. Their research confirms the importance of innovative approaches in developing sustainable urban infrastructure.

The work of Winter et al. (2020) focuses on the issue of the relationship between the development of international eco-tourism, the tourism potential of the region and sustainable development. Thus, this study analyzes the issue of transforming the tourism sector of the region according to the principles of sustainable development, while maintaining the tourism potential of the region and increasing the interest of foreign tourists. The authors of the study propose a number of development measures and strategies, which include the development of infrastructure, logistics networks and services. The findings of this study provide a clear understanding of the importance of introducing an integrated approach to the management of modern recreational areas in order to find a balance between commercial success and sustainable development.

Alazzam et al. (2023) present an innovative model for e-commerce development, emphasizing its role in ensuring business economic security. The study highlights the importance of integrating digital solutions into commercial activities, which can significantly enhance operational efficiency and security. This model can be particularly useful in the recreational field, where businesses often rely on efficient logistics and secure transactions to meet customer expectations .

Alazzam et al. (2023) develop an information model for e-commerce platforms, focusing on socio-economic systems and legal compliance in a global digitalization context. This model is pertinent to recreational logistics, where accurate information flow and compliance with international regulations are critical for smooth operations .

Bani-Meqdad et al. (2024) address the challenges of protecting intellectual property within the cyber-environment, emphasizing sustainable regional development. Ensuring intellectual property rights in the recreational field can foster innovation in logistics solutions and protect proprietary models and technologies used in international logistics management .

Bazyliuk et al. (2019) compare institutional dynamics in regional development, providing methodological insights that can be adapted for logistics management in the recreational sector. Understanding regional differences and institutional frameworks can help tailor logistics strategies to specific contexts, enhancing efficiency and compliance . Blikhar et al. (2023) explore economic and legal aspects of counteracting corruption, which is vital for maintaining the integrity of logistics operations. Implementing robust anti-corruption measures ensures fair and transparent logistical processes, essential for maintaining trust in international commercial activities .

Kopytko and Sylkin (2023) model information support for combating corruption in economic security management. Effective information systems can prevent corruption in logistics, ensuring reliable and secure operations within the recreational field's commercial activities .

Kryshtanovych et al. (2021) investigate ways to increase creativity in psychology students, emphasizing professional development. Encouraging creative problem-solving skills can lead to innovative logistics solutions in the recreational sector, addressing complex international management challenges . Kryshtanovych et al. (2024) discuss the development of information systems involving artificial intelligence (AI) for work optimization. AI can significantly enhance logistics management by providing predictive analytics, optimizing routes, and improving decision-making processes in international logistics for the recreational field .Sylkin et al. (2018) assess financial security as a precondition for anti-crisis management in engineering enterprises. Applying these principles to the recreational field can help businesses build resilient logistics systems capable of withstanding economic fluctuations and crises .

Despite the presence of some studies that have introduced new methods and paradigms for organizing logistics systems in recreational areas, our research still reveals scientific gaps and shortcomings. These gaps indicate the need for further consideration and refinement of concepts and approaches to optimize logistics systems in the context of sustainable development of recreational areas (Table 1)

Table 1: The main gaps and shortcomings

№	Research gaps and shortcomings	Characteristics
1	Lack of a built-in approach to the logistics of recreational areas	Many existing studies focus on individual aspects of logistics, but there are no studies that consider it as an integrated system. This makes it difficult to understand the interaction between different elements of the logistics system and can lead to suboptimal use of resources.
2	Insufficient attention to the impact of tourism trends on logistics.	Many studies have focused on the internal processes of recreational logistics, but little attention has been paid to external influences such as changes in tourism trends or demand. This may lead to the system's inability to adapt to changing conditions and loss of competitiveness.
3	Insufficient attention to the impact of commercial and technological innovation.	Some studies may have limited attention to the use of modern technologies in recreational logistics. Insufficient use of innovation can lead to increased costs or wasteful use of resources.

Source: own analysis

The scientific task of the study is to determine the logical potential of the recreational zone, including indicators that influence the sustainable development of the recreational zone.

METHODOLOGY

In our study, we choose multidimensional mathematical and statistical analysis as the main methodological tool for achieving our goals - optimizing the logistics systems of recreational areas in the context of attracting new international tourist flows and complying with the principles of sustainable development. This method is selected for its ability to analyze the complex relationships between various factors influencing the functioning of recreational areas and determine optimal development strategies.

The use of multivariate mathematical and statistical analysis can become a decisive tool in achieving the success of our work, since it makes it possible to conduct a detailed analysis of various factors that influence the efficiency and consistency of the logistics system for our chosen recreational area.

Considering this method in more detail, it should be noted that the latter is based on the use of specific mathematical models and statistical methods. An effective combination of these two components makes it possible to understand and evaluate the relationships and dependencies of various elements of the system, and on the basis of this to form effective management decisions.

The modern use of multivariate mathematical and statistical analysis in scientific research consists of using computer programs to process large amounts of data. This allows for complex analyzes and calculations that were previously impossible due to the volume of data and its complexity. In our study, we use multivariate mathematical and statistical analysis to analyze and optimize the logistics system of a recreational area, in particular the Prague Zoo. We examine various aspects of the system's functioning, including visitor service time, resource efficiency, and visitor enjoyment.

The advantages of multivariate mathematical and statistical analysis are its objectivity and accuracy. It allows you to obtain quantitative results that can be used to make informed management decisions. In addition, this method allows you to analyze many factors simultaneously and take into account their relationships.

However, the multivariate mathematical and statistical analysis also has its drawbacks. One of them is the difficulty of processing large amounts of data. Successful application of this method requires access to a large amount of data and highly qualified specialists to analyze it.

It should also be taken into account that multivariate mathematical and statistical analysis may be limited in taking into account unconventional factors or cases that go beyond standard mathematical models. This may lead to inaccuracies in the analysis results.

RESULTS AND DISCUSSION

Prague Zoo serves as an exemplary recreational area, providing a unique blend of leisure and educational experiences to its visitors. Spread over 58 hectares, the zoo offers a verdant retreat from the urban landscape of Prague. It features diverse habitats ranging from Indonesian jungles to African savannahs, housing over 5,000 animals from 680 species. The well-designed pathways and landscapes encourage walking and

exploration, promoting physical activity among visitors. The zoo also includes playgrounds, educational trails, and a chairlift, enhancing its appeal as a family-friendly destination that combines fun with learning opportunities about wildlife and conservation (Figure 2).

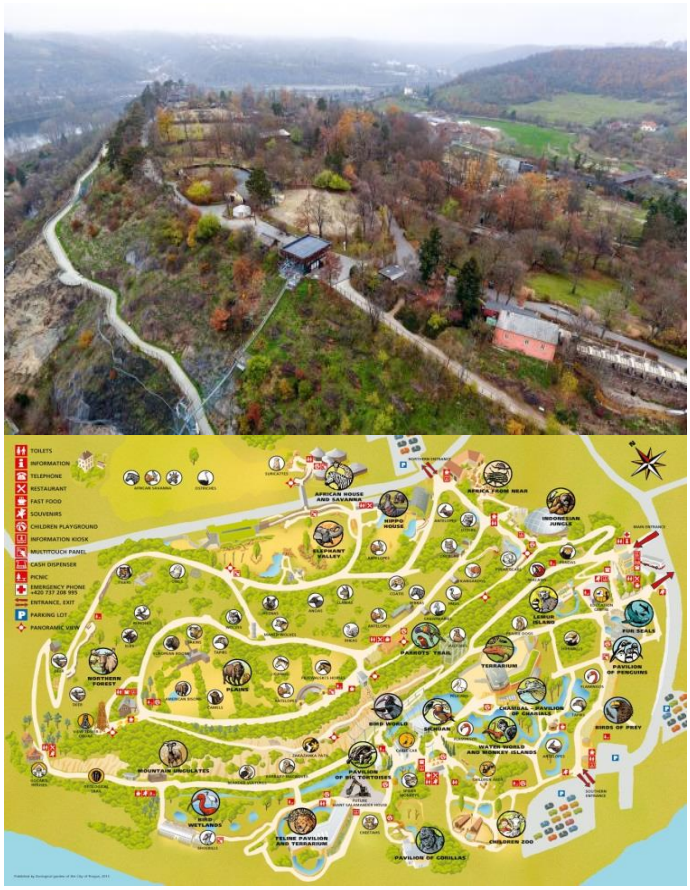

Figure 2: Prague Zoo planning system

Source: Official Internet source

From a sustainable development perspective, Prague Zoo contributes significantly to both local and international conservation efforts. It participates in global breeding programs aimed at preserving endangered species, and it has been instrumental in the reintroduction of several species back into their natural habitats, such as the Przewalski's horse in Mongolia. These conservation initiatives not only help protect biodiversity but also raise awareness about the importance of environmental stewardship among the zoo's visitors. This proactive role in conservation aligns with global sustainability goals, including those related to life on land (SDG 15). Educationally, Prague Zoo plays a crucial role in fostering a deeper understanding and appreciation of biodiversity and ecosystems among the Czech public and international visitors. It offers a range of educational programs, guided tours, and interactive exhibits that provide insights into the complexities of natural habitats and the challenges facing wildlife conservation. These programs are tailored to different age groups, enhancing their impact across generations. By educating visitors about the importance of ecological balance and conservation, the zoo nurtures a culture of environmental responsibility and informed citizenship, contributing to sustainable development education (SDG 4). Moreover, Prague Zoo's commitment to environmental sustainability extends to its operational practices. It has implemented various green initiatives, such as water

conservation measures, recycling programs, and the use of renewable energy sources to power its facilities. These practices not only reduce the zoo's ecological footprint but also serve as a model for sustainable operation in the leisure and tourism sectors. By integrating these environmental considerations, Prague Zoo contributes to the sustainable development of the Czech Republic, promoting sustainable cities and communities (SDG 11) while enhancing its reputation as a leader in environmental conservation.

In total, there are around 4 major zoos spread across the Czech Republic, each offering unique exhibits and contributing to conservation efforts. The share of an individual zoo as a recreational zone on the market is determined as a percentage by dividing the value of a certain indicator of the activity of a particular zoo by the total result collected for 4 zones, according to formula (1):

$$P=\frac{VP}{\sum VP} \qquad (1)$$

VP – the scope of implementation of the services of a set of zoos in a certain recreational zone; ΣVP - the volume of services provided by the totality of zoos in all regions of the Czech Republic.

By comparing statistical data on the main indicators of the zoo in Prague with generalized data throughout the country, the specific weight of the participation of this recreation area in the total volume of tourist services was determined and their rating was calculated on the scale of the Czech Republic, taking into account logistics indicators (Table 2).

Table 2: Specific weight of indicators of sustainable development of key zoos in the Czech Republic

Indicators		**Values by key zoos**			
Number of recreational enterprises	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	13.4	12	8	7.5
Disposable zone capacity	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	21.3	13.9	8.7	7.3
Total number of tourists	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	29.1	13.2	6	5.5
Number of international tourists	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	57.5	8	5.7	5.6
Duration of stay in zones	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	27.9	19.3	7.5	5.3
Number of structural logistics units	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	11.9	10	9	8.2
Income from services provided	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	47.3	13.9	5.6	4.5
Income from additional services	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	51.4	11.8	5.6	5.5
Average number of staff	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	29.3	17.3	6.9	6.5

Source: own analysis

Prague Zoo stands out in terms of sustainable development due to its comprehensive approach to conservation, education, and environmental sustainability. It actively participates in international breeding programs that help protect endangered species, such as the Przewalski's horse, and has seen significant success in breeding rare animals. The zoo also focuses on educating the public about wildlife conservation through various interactive exhibits and educational programs. Environmental sustainability is integral to its operations, with initiatives like waste reduction, water conservation, and the use of renewable energy sources. These efforts have not only enhanced the zoo's reputation but also set a high standard for zoological gardens globally in balancing ecological responsibilities with visitor engagement and animal welfare.

The procedure for calculating efficiency indicators of logistics and international management in recreational areas is presented in Table 3.

Table 3: The main indicators of logistics and international management in recreational areas

Indicators	Calculations
Average capacity for products in warehouse	$\frac{OT}{KG}$ where OT – disposable capacity; KG – number of warehouses
Average delivery time	$\frac{TI}{KP}$ where TI – transportation triviality; KP – the number of operations involved in transportation
International coefficient	$\frac{TP}{OM * 365}$ where TP – part of international operations; OM – number of adopted management decisions of an international nature
Proportion of foreigners served	$\frac{CK}{CP}$ where CK – part of foreign clients; P – number of all clients
Average cost of logistics services	It is calculated as the delivery time for one product to the zone
Transport system efficiency	$\frac{TO}{P}$ where TO – income from the transportation of international tourists; P – transport capacity

Source: own analysis

Logistics in zoos plays a critical role in ensuring the health and well-being of animals, the efficiency of zoo operations, and the enhancement of visitor experiences. Effective logistics management covers the procurement, storage, and distribution of food, medical supplies, and equipment, essential for maintaining the diverse needs of zoo inhabitants. For example, precise temperature control for perishable goods, accurate inventory management, and timely distribution systems are indispensable to prevent spoilage and ensure that dietary needs of different species are met punctually and efficiently. Moreover, logistics is crucial in the design and maintenance of enclosures, facilitating naturalistic habitats that promote animal welfare and engage visitors. The transport logistics of animals, whether for zoo transfers, breeding programs, or conservation initiatives, also demands meticulous planning and execution to ensure animal safety and compliance with international wildlife regulations.

In embracing sustainable development, zoos utilize logistics to minimize their environmental impact and foster conservation efforts. Sustainable practices in zoo logistics include implementing waste reduction strategies, such as composting animal waste and using environmentally friendly packaging for supplies. Energy-efficient transportation methods and renewable energy sources for heating, cooling, and lighting facilities further reinforce their commitment to sustainability. Zoos often engage in sustainable procurement policies, prioritizing suppliers who adhere to ethical and eco-friendly practices. By integrating these practices, zoos not only enhance their operational efficiency but also educate and inspire visitors about sustainability, promoting conservation-minded behavior that extends beyond the zoo environment. These initiatives are pivotal in positioning zoos as leaders in conservation and as advocates for the sustainable coexistence of human and wildlife communities.

Based on the calculation procedure in Table 3, we present the results of calculation and comparison of sustainable development indicators for individual recreational areas in the Czech Republic (Table 4).

Table 4: Specific weight of indicators of sustainable development of key zoos in the Czech Republic

Indicators		Values by key zoos			
Average capacity for products in warehouse	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	177	117	103	92
Average delivery time	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	148	96	96	124

International coefficient	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	140	135	105	45
Proportion of foreigners served	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	200	94	59	53
Average cost of logistics services	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	395	104	100	54
Transport system efficiency	Zone	Prague zoo	Brno Zoo	Ostrava Zoo	Dvůr Králové Zoo
	%	571	99	61	54

By standardizing these indicators, we can present an integration indicator of logistics potential in the context of the sustainable development of a recreational area such as the Prague Zoo. The total score for each region is determined by their total for nine indicators, after which the share belonging to the region on a national scale is calculated. We consider it appropriate to apply a scale to assess the level of potential of the selected recreational zone: 0 – 2.0% – regions with the lowest potential; 2.1 – 3.0% – regions with low potential; 3.1 – 5.0% – regions with average potential; 5.1 – 7.0% – regions with high potential; 7.1% and above are regions with high potential for sustainable development (Fig.3).

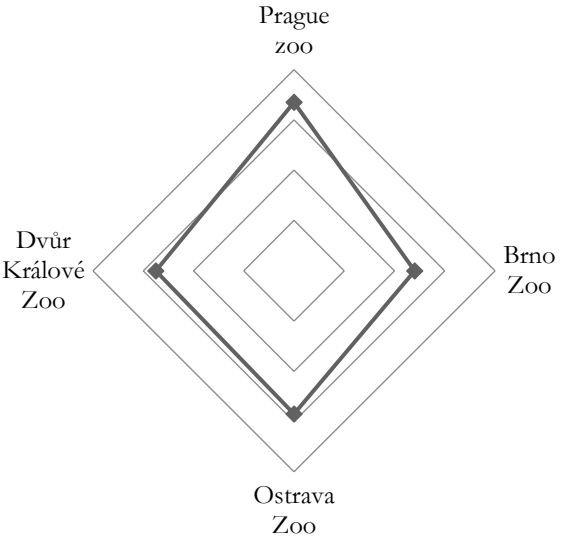

Figure 3: Evaluation of the logistics potential of zoos in the Czech Republic in the context of ensuring their sustainable development

Source: own analysis

In practical terms, Prague Zoo's rating of 6.7% in the context of sustainable development signifies that it is a leader in implementing sustainable practices among recreational zones. This high score likely reflects successful initiatives in areas like energy efficiency, sustainable sourcing, biodiversity conservation, and educational outreach, which collectively contribute to a reduced ecological footprint and enhanced conservation outcomes. Being in the high potential category also positions the zoo as a model for other institutions, highlighting its

commitment to sustainability that goes beyond mere compliance with environmental standards. This status not only enhances the zoo's reputation but also serves as a critical educational tool for visitors, demonstrating the practical applications of sustainable practices in wildlife conservation and recreational management.

DISCUSSION

Having carried out the main methodological part of the study, the next step is to conduct a comparative analysis of our study with relevant studies in this area.

Thus, Snyman and Bricker (2019) examine the distribution of benefits from tourism in protected areas, focusing on the need to provide benefits to local communities. Their approach emphasizes the importance of social justice in the context of sustainable development. Our research extends this perspective by emphasizing the use of logistics systems to enhance the attractiveness of recreational areas for international tourists, which includes a more integrated approach to commerce and persistence.

Björklund et al. (2016) analyze sustainability in the context of large retailer logistics, focusing on the environmental impact of logistics operations. This research is important for understanding how large corporations implement established practices. Our work brings this analysis into the context of recreational areas, where sustainable development includes cultural and biodiversity aspects that influence international tourism.

While Osman et al. (2023) explore green logistics practices in Swedish transport and logistics, especially the use of biomethane. This approach shows how innovative technologies can contribute to sustainability in the transport industry. In the context of our study, this confirms the potential of emerging technologies to optimize logistics in recreational areas, in particular at the Prague Zoo, to ensure consistency and attract international visitors.

Evangelista (2014) explores environmental sustainability practices in the transportation and logistics services industry through case studies. This study shows how companies can implement different strategies to reduce their environmental impact. Our research extends this model by adapting it to the unique context of recreational areas, where ongoing logistics not only serves to protect the environment but also to promote commerce.

An interesting study by Drury et al. (2023), in which the authors focus on defining persistence with animal welfare in mind in their studies. This highlights the importance of integrating ethical proceedings into established practices. Our research extends this approach to include consideration of animal welfare as a core element in the development of logistics strategies responsible for international tourism flows and the commercial success of recreational areas.

While Vinnari et al. (2022) their research focuses on the inclusion of animals in concepts of permanence and consideration, highlighting the importance of visibility of often overlooked aspects in sustainable development. In contrast to their approach, our research not only includes animals in a persistence context, but also adapts logistical systems to support their well-being in an environment of growing international tourism, which requires the harmonious interaction of commercial interests with ethical standards.

Dileep and Pagliara (2023) consider recreational transport and tourism in their work, focusing on strategies for optimizing transport systems for tourism needs. Our research is different in that we focus on optimizing logistics systems specifically for recreational areas such as zoos, where challenges include not only transporting visitors, but also ensuring consistency and efficiency of resource management in the face of international tourist flows.

Yuo et al. (2022) study route optimization for hop-on hop-off tourist bus logistics using a new method. This approach has a significant impact on improving tourism services. In contrast, our research does not simply improve routing, but also integrates these changes into the larger recreational supply chain, specifically with the goal of increasing consistency and reducing environmental impact, which places an emphasis on scaling up the impact of these optimizations.

Han et al. (2020) consider new types of tourism as a promising direction in the field of tourism, noting its environmental benefits. In our study, while we also consider the potential of eco-transport, we expand the discussion on assessing all components of a recreational area's logistics system, where cycling is only one of many aspects of a broader strategy to attract international tourists and provide commercial benefits.

Having carried out a detailed comparative analysis of our research with relevant ones in this area, we can conclude that it is relevant and brings scientific novelty. So, first of all, the innovativeness of our research lies in the fact that all management decisions and strategies that have been formed include not only measures to optimize commerce and logistics in the recreational area, but adapt these measures in accordance with modern principles of sustainable development. An innovative and multidimensional mathematical and statistical method that makes it possible to make a detailed and comprehensive analysis of key aspects of logistics, on the basis of which strategies will be formed to attract international tourists and develop commerce, which will be effective, but also safe from an environmental point of view.

CONCLUSION AND RECOMMENDATION

The challenge of organizing logistics systems in zoos, particularly Prague Zoo, in the context of sustainable development is that such systems must balance the needs of efficiency, environmental responsibility and commercial benefit. Attracting international tourists is important for any recreational area, as it not only helps to increase revenue, but also enhances the international image and reputation of the area. At the same time, the increase in tourist flows poses a challenge for zoos to manage these flows in a way that minimizes the negative impact on animals and their habitats.

The scientific research helped to identify key aspects that require optimization in the Prague Zoo's logistics system to attract international tourists, while maintaining the principles of sustainable development. The analysis resulted in the development of strategic directions that can improve the zoo's efficiency and responsibility to the environment and the public. These destinations not only address the needs of animals and visitors, but offer new opportunities for commercial success in a globalized tourism market.

One of the main limitations of our study is that the analysis was carried out in the context of a recreational area such as a zoo, although it has significant logistical requirements, but it also has specific problems, needs and features that may not be typical for other recreational areas. In addition, the method of multivariate mathematical and statistical analysis we used requires a large amount of data and accuracy of implementation, which can become an obstacle to fatcore in its routine implementation.

Future research will be aimed at expanding the scope of analysis, including other recreational zones in this analysis, for a better understanding of which factors are universal and which are specific for the development of logistics systems of recreational zones in the context of sustainable development. At the same time, it is possible to facilitate the use of the method of multivariate mathematical and statistical analysis by involving modern technologies and software in complex analyzes and calculations.

REFERENCES

Alazzam, F. A. F., Tubishat, B. M. A.-R., Savchenko, O., Pitel, N., & Diuk, O. (2023). Formation of an innovative model for the development of e-commerce as part of ensuring business economic security. Business: Theory and Practice, 24(2), 594–603. https://doi.org/10.3846/btp.2023.19781

Alazzam, F. A. F., Tubishat, B. M. A.-R., Storozhuk, O., Poplavska, O., & Zhyvko, Z. (2024). Methodical approach to the choice of a business management strategy within the framework of a change in commercial activities. Business: Theory and Practice, 25(1), 1–10. https://doi.org/10.3846/btp.2024.19676

Alazzam, F.A.F., Aldrou, K.K.A.R., Berezivskyy, Z., Zaverbnyj, A., Borutska, Y. (2023). State management of the system of rational environmental use in the context of commercial development of the bioeconomy: Ecological aspect. International Journal of Environmental Impacts, Vol. 6, No. 4, pp. 155-163. https://doi.org/10.18280/ijei.060401

Alazzam, F.A.F., Salih, A.J., Amoush, M.A.M., Khasawneh, F.S.A. (2023). The nature of electronic contracts using blockchain technology - Currency bitcoin as an example. Revista De Gestão Social E Ambiental, 17(5): e03330. https://doi.org/10.24857/rgsa.v17n5-014

Alazzam, F.A.F., Shakhatreh, H.J.M., Gharaibeh, Z.I.Y., Didiuk, I., Sylkin, O. (2023). Developing an information model for E-Commerce platforms: A study on modern socio-economic systems in the context of global digitalization and legal compliance. Ingénierie des Systèmes d'Information, Vol. 28, No. 4, pp. 969-974. https://doi.org/10.18280/isi.280417

Azizi, R., Maleki, M., Moradi-Moghadam, M., and Cruz-Machado, V. (2016). The impact of knowledge management practices on supply chain quality management and competitive advantages. Manag. Prod. Eng. Rev. 7, 4–12. https://doi.org/10.1515/mper-2016-0001

Baldner, C. (2018) Morality and environment: analysing the effects of the moral foundations on attitudes toward the environment in Italy. Rass Psicol. 35, 67–77. https://doi.org/10.13133/1974-4854/16686

Bani-Meqdad, M.A.M., Senyk, P., Udod, M., Pylypenko, T., Sylkin, O. (2024). Cyber-environment in the human rights system: Modern challenges to protect intellectual property law and ensure sustainable development of the region. International Journal of Sustainable Development and Planning, Vol. 19, No. 4, pp. 1389-1396. https://doi.org/10.18280/ijsdp.190416

Bazyliuk, V., Shtangret, A., Sylkin, O., & Bezpalko, I. (2019). Comparison of institutional dynamics of regional development publishing and printing activities in Ukraine: Methodological and practical aspects. Business: Theory and Practice, 20, 116–122. https://doi.org/10.3846/btp.2019.11

Björklund, M., Forslund, H., Persdotter Isaksson, M., (2016) Exploring logistics-related environmental sustainability in large retailers, International Journal of Retail & Distribution Management, 44(1), 38-57. https://doi.org/10.1108/IJRDM-05-2015-0071

Blikhar, M., Vinichuk, M., Kashchuk, M., Gapchich, V., Babii , S. (2023). Economic and legal aspects of ensuring the effectiveness of counteracting corruption in the system of anti-corruption measures of state authorities. Financial and Credit Activity Problems of Theory and Practice, 4(51): 398-407. https://doi.org/10.55643/fcaptp.4.51.2023.4138

Centobelli, P., Cerchione, R., and Esposito, E. (2017). Environmental sustainability in the service industry of transportation and logistics service providers: Systematic literature review and research directions. Transp. Res. Part D Transp. Environ. 53, 454–470. https://doi.org/doi:10.1016/j.trd.2017.04.032

Dileep, M.R., Pagliara, F. (2023). Recreational Transportation and Tourism. In: Transportation Systems for Tourism. Advances in Spatial Science. Springer, Cham. https://doi.org/10.1007/978-3-031-22127-9_12

Dogaru, L. (2014) Preserving the right to a healthy environment: European jurisprudence. Procedia Soc Behav Sci. 141, 1346–1352. https://doi.org/10.1016/j.sbspro.2014.05.232

Drury, M., Fuller, J. & Hoeks, J. (2023) Embedding animals within a definition of sustainability. Sustain Sci 18, 1925–1938 https://doi.org/10.1007/s11625-023-01310-7

Evangelista, P. (2014) Environmental Sustainability Practices in the Transport and Logistics Service Industry: An exploratory Case Study Investigation. Research in Transportation Business and Management 12, 63–72. https://doi.org/10.1016/j.rtbm.2014.10.002

Gudehus T, Kotzab H. (2012) Comprehensive logistics. Springer Science & Business Media; https://doi.org/10.1007/978-3-642-24367-7

Han, H., Lho, L.H., Al-Ansi, A., & Yu, J. (2020). Cycling tourism: A perspective article. Tourism Review, 75(1), 162–164. https://doi.org/10.1108/TR-06-2019-0268

Kopytko, M., & Sylkin, O. (2023). Modelling information support for combating corruption in the economic security management system of the state. Social and Legal Studios, 6(3), 60-66. https://doi.org/10.32518/sals3.2023.60

Kryshtanovych, M., Bilyk, V., Hanushchyn, S., Sheremet, I., & Vasylenko, K. (2021). Modelling the ways to increase the creativity of psychology students as a basic factor in professional development. Creativity Studies, 14(1), 34-50. https://doi.org/10.3846/cs.2021.12571

Kryshtanovych, M., Kryshtanovych, S., Stepanenko, L., Brodiuk, Y., & Fast, A. (2021). Methodological approach to determining the main factors for the development of creative thinking in students of creative professions. Creativity Studies, 14(2), 391-404. https://doi.org/10.3846/cs.2021.14806

Kryshtanovych, M., Snihur, L., Buzhyna, I., Tiurina, D., Imeridze, M. (2024). Development of new information systems with the involvement of artificial intelligence for the men and women's work: A methodical approach to assessment and selection of the optimal. Ingénierie des Systèmes d'Information, Vol. 29, No. 2, pp. 723-730. https://doi.org/10.18280/isi.290234

Lan, S., Tseng, M. L., Yang, C., & Huisingh, D. (2020). Trends in sustainable logistics in major cities in China. The Science of the total environment, 712, 136381. https://doi.org/10.1016/j.scitotenv.2019.136381

Miyake, S. (2024). The Value of Zoos as Educational Resources for Sharing the Sustainable Development Goals with the Public: A Japanese Perspective. In: Fujii, H., Lee, SK. (eds) Science Education for Sustainable Development in Asia. Education Innovation Series. Springer, Singapore. https://doi.org/10.1007/978-981-99-8711-5_12

Monz, C.A., Cole, D.N., Leung, Y.F., Marion J.L. (2010) Sustaining visitor use in protected areas: future opportunities in recreation ecology research based on the USA experience. Environ Manag. 45, 551–562. https://doi.org/10.1007/s00267-009-9406-5

Moshood, T. & Sorooshian, S. (2021). The Physical Internet: A means towards achieving global logistics sustainability. Open Engineering, 11(1), 815-829. https://doi.org/10.1515/eng-2021-0080

Osman, M. C., Huge-Brodin, M., Ammenberg, J., & Karlsson, J. (2023). Exploring green logistics practices in freight transport and logistics: a study of biomethane use in Sweden. International Journal of Logistics Research and Applications, 26(5), 548–567. https://doi.org/10.1080/13675567.2022.2100332

Saleh, A.J., Alazzam, F.A.F., Aldrou, K.K.A.R., Zavalna, Z. (2020). Legal aspects of the management of cryptocurrency assets in the national security system. Journal of Security and Sustainability Issues, 10(1): 235-247. https://doi.org/10.9770/jssi.2020.10.1(17)

Snyman, S., & Bricker, K. S. (2019). Living on the edge: benefit-sharing from protected area tourism. Journal of Sustainable Tourism, 27(6), 705–719. https://doi.org/10.1080/09669582.2019.1615496

Sylkin, O., Shtangret, A., Ogirko, O., Melnikov, A. (2018). Assessing the financial security of the engineering enterprises as preconditions of application of anti-crisis management: Practical aspect. Business and Economic Horizons, 14(4): 926-940. https://doi.org/10.15208/beh.2018.63

Vinnari, E., Vinnari, M. (2022) Making the invisibles visible: including animals in sustainability (and) accounting. Crit Perspect Account 82, 102324. https://doi.org/10.1016/J.CPA.2021.102324

Wang, C., Liu, H., Yu, L., Wang, H. (2020) Study on the Sustainability Evaluation Method of Logistics Parks Based on Emergy. Processes. 8(10), 1247. https://doi.org/10.3390/pr8101247

Winter, P., Selin, S., Cerveny, L., Bricker, K. (2020) Outdoor Recreation, Nature-Based Tourism, and Sustainability. Sustainability. 12(1), 81. https://doi.org/10.3390/su1201008

Yuo, T., Chen, W.V., & Tseng, T.A., (2022). Optimising the Routes of the Hop-On Hop-Off Sightseeing Bus: A New Method Explored. http://dx.doi.org/10.2139/ssrn.4084965