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LOGISTICS IT SUPPORT SOLUTIONS IN ZALA COUNTY

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Károly SZABÓ[1]

[1]Budapest Business University, Faculty of Finance and Accountancy, Buzogány u. 10-12., H-1149 Budapest, Hungary
Corresponding author. E-mail: szabo.karoly@uni-bge.hu
ORCID: (https://orcid.org/0009-0000-8595-461X)

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Industry 4.0 solutions such as the use of AI are becoming increasingly visible in everyday logistics processes. Many publications have already dealt with what technological innovations could be introduced to improve the flow of materials, but relatively few have dealt with the extent to which these theoretical solutions are also present in practice. In connection with this gap, the current research aims to examine the effectiveness and impact of AI use in the logistics field. This paper is a follow-up study on the topic as the logistics AI use was already analyzed in Pest County in the framework of this study direction. Since this study is still the second step of the already commenced research work, the very study does not try to draw conclusions leading to generalization but rather aims to draw causal conclusions of a pilot nature. In the research tools, the paper uses the qualitative design from the previous study (applied in another geographical territory – Zala County) but at the same time examines other analyzing methods like SEM modelling as a potential tool to be integrated.

Keywords: Logistics; AI; ERP system; Strategy; Planning.

INTRODUCTION

With Industry 4.0 solutions, several technological developments have taken place in many other areas affecting logistics in the past few years. If we want to mention specific examples then we can highlight the warehouse management supported by drones, and the use of RPA for the automation of repetitive tasks, and we could also mention the growing use of artificial intelligence in logistics (and also worldwide). However, one common point in these developments is that adequate software support is a basic requirement. For the previously mentioned solutions to function properly, companies must have adequate ERP foundations. If these are ensured then the question also arises as to how risk-taking the given company is and how open it is to the use of new technologies? During the primary examination of the literature, it became visible that a large number of studies represent the implementation and introduction of individual developments, as well as their theoretical framework but besides these, the proportion of those publications which are examining the effects and the impact of the technologies after their actual introduction is much lower. The resulting research gap was already actively touched on in a previous study (Szabó, 2024) in which the application of the technology was examined among enterprises in Pest County (Hungary) that introduced AI in the field of logistics. In the present study, a similar framework will be used, with the addition that not only AI use but also a complex IT utilization level will be analyzed - in another Hungarian county – in Zala County. In the framework of the study, on one hand, the results from the previous paper will be compared to the Zala County sampling; furthermore, the potential expansion of the framework by the SEM model in the field of local logistics software solutions will be examined. Since there was no research on the use of AI in logistics software in the county before, therefore a qualitative approach was chosen as more complex phenomena can be properly mapped with this framework. According to the previously outlined research gap, the research will examine the following topics:

– The use of AI by Zala County enterprises in the field of logistics, as well as their effectiveness

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– The aggregated logistics-IT capacities of local businesses within which the share of AI from the point of view of corporate strategy will be also assessed

As it was mentioned earlier, the topics outlined above will be assessed among Zala County enterprises, which is the next step of the previously started research in Pest County. An important element of the latter was how the application of AI represents a strategic key factor in the narrower topic, for which the integration of the results with the SEM model can be of great help. Due to the fact that the Pest County research showed that there is no result for the strategic importance of AI, the main output of this study will be the determination of this through the integration of the previously mentioned SEM model (Lee et al., 2018; Peres et al., 2020).

As mentioned earlier, the main element of the research is to map the strategic significance of the AI application. After the primary study of the existing literature, it became apparent that there has been a low number of results on the narrower topic so far, so this research will mostly present the cause-and-effect relationships in a pilot manner. Accordingly, the paper does not try to define conclusions in the direction of generalization, but rather it tries to create an adaptable framework that enables the long-term continuation of sampling. In addition to a comprehensive and adaptive knowledge of research methodologies, and after fully delineating the research gap and research goals, the following research questions were recorded (Winkelhaus & Grosse, 2020):

Q1: On what level of effectiveness is the use of logistics AI by local enterprises in Zala County?
Q2: To what extent is the use of logistics AI a strategic factor for enterprises in Zala County?

RESEARCH METHOD

In order to examine previously formulated research questions, firstly the existing results will be analyzed within the framework of a comprehensive literature review. The literature review aims to present the general use of AI in the logistics field, its basic operation, and the successes/failures of AI projects so far. After presenting the context, a qualitative sampling will be conducted to examine research questions Q1 and Q2. Due to the fact that little numerical data was available on the narrower topic before the research, the previously mentioned qualitative research design was chosen since with this method we can gain a deeper insight into the more complicated processes (Babbie, 2008; Horváth & Mitev, 2015). The research tools were determined by an understanding and adaptive review of qualitative and quantitative methodologies (Lewin, 1946). After choosing the methodology, the characteristics of qualitative sampling were defined, including the sampling framework, the place and the method of sampling. The semi-structured qualitative interview was constructed as follows:

– Leading questions, which may also contain important information
– Questions specific to the logistics AI application, which target the general operation and field of application
– Questions related to the results of the logistics AI application
– Questions about the main type errors of the logistics AI application
– Based on AI experiences so far, questions about a general overview in the field of logistics

During the qualitative research, at least 10 interviews were conducted. The sampling framework was provided by the Zala County Foundation for Enterprise Promotion. The following filters were applied to the companies in the database:

– Active use of AI in the field of logistics
– The headquarters is located in Zala County
– Actual material flow, physical goods transfer (service sector is excluded in this phase)
– Willingness to participate in research

The interviews will be conducted with the first 10 positive respondents according to the order of receipt. The planned time frame is 3 months, from January 1, 2024, to March 31, 2024. The planned location of the research is the headquarters of each enterprise (Király & Géring, 2016; Saunders et al., 2009). Previously formulated research questions will be analyzed as a case study, i.e. the paper does not treat the obtained results as if they point in the direction of generalization, rather it strives to learn about domestic cause-and-effect relationships. Accordingly, based on the chosen research methodology, the paper tries to formulate filtered statements based on the experience of the results obtained.

AI SOLUTIONS IN LOGISTICS WORLDWIDE

In this section, the results of the literature review will be presented which not only helps to put the results of the qualitative data sampling into context but on the other hand, provides an opportunity to compare them. As it was mentioned earlier, the theoretical results have a high number in the narrower topic. Briefly, the main territory can be described as a part of Industry 4.0, which is also known as the fourth industrial revolution and represents the integration of digital technologies into manufacturing and other industrial sectors. It encompasses a range of technologies such as *artificial intelligence*, the Internet of Things (IoT), big data analytics, robotics, and additive manufacturing (3D printing), among others. The key features of Industry 4.0 include the interconnectedness of machines and systems through IoT, real-time data collection and analysis for predictive maintenance and process optimization, autonomous decision-making through AI, and the customization of products through advanced manufacturing techniques (Ahmed et al. 2022; Bécueet al., 2020.; Jan et al., 2023). AI applications in Industry 4.0 include predictive maintenance, where machine learning algorithms analyse data from sensors to predict equipment failures before they occur, thereby minimizing downtime and maintenance costs. AI also enables intelligent manufacturing processes, such as adaptive production lines that can adjust in real-time based on changing demand or unforeseen circumstances. Furthermore, AI facilitates quality control through computer vision systems that inspect products for defects with precision and speed. It also enables the development of autonomous robots and drones for tasks like material handling, assembly, and inventory management. Based on the literature, the most important areas of application of the technology could be the following in the near future (Chien et al., 2020; Kowalski et al., 2012):

- **Predictive Analytics:** With the help of AI, logistics companies can predict demand and supply chain changes which enables inventory optimization, more accurate determination of delivery times and improved production planning.
- **Route Optimization** - AI algorithms may be able to optimize freight routes, taking into account traffic data, weather conditions and other variables which reduce fuel consumption and delivery times while minimizing costs.
- **Warehouse Management** - AI can enable more efficient management and stocking of warehouses. With the help of automated systems, the delivery of goods in and out becomes faster and more accurate, while minimizing the possibility of human errors.
- **Inventory Management** - With the help of AI-based inventory management systems, companies can more accurately monitor their stocks and detect shortages or overstocking in time. This makes it possible to avoid overstocking and maintain optimal stock levels.
- **Demand Forecasting** - With the help of AI-based models, logistics companies can predict demand more accurately, thereby planning the supply chain more efficiently and reducing unnecessary costs.
- **Other application**s – Through AI-based models, other areas - e.g. CRM systems, HR and maintenance panels - can also be developed, either through predictive solutions or process automation solutions.

The application possibilities listed above have so far appeared in the literature from the point of view that researchers have investigated the theoretical possibilities of using the approaches listed above. It can be said that the previous research provided a comprehensive understanding of how everyday logistics processes could potentially benefit from AI improvements but there is a lack of information regarding the actual implementation of these improvements in enterprises. Other applications encompass areas like the HR module, CRM systems, or maintenance, which are organically linked to logistics but are not the primary focus. Literature also offers numerous examples of actual implementations in these areas, where companies make decisions based on AI recommendations, thus providing real decision support. For instance, if machine intelligence predicts maintenance needs based on maintenance logs, and the company performs the repair as suggested, it is considered a genuine use of logistics AI (Dopico et al., 2016; Muthukrishnan et al. 2020; Péter, 2023).

As it was mentioned earlier, most of the existing research aims at the possibilities of use and a smaller part at the post-analysis of the specific use. In addition to these, a third significant segment has emerged in the topic, which is none other than the examination of the effects of the introduction.

Within this, the most popular area is the use of AI for the role of the workforce. The topic is, of course, not only significant in the field of logistics AI use but also an outstandingly researched topic within global AI use. A more in-depth look at the literature reveals a mixed picture. Most researchers agree that the higher level of use of AI leads to some kind of workforce reduction, but its extent is still undetermined. The outcome of the latter largely depends on the future limitations of technology, such as reliability, development or resource requirements (Di Capua et al., 2023; Jackson et al., 2024; Woschank et al., 2020).

The situation is similar to strategic importance. Currently, based on the literature, it is clearly visible that companies are in a strong experimental phase not only domestically, but also internationally. There are implementations where AI projects are created in a forced way, but for the time being, we have relatively little information about what level of strategic output the application of logistics AI means to businesses (how powerful is the application to influence the enterprise competition?) (Javaid et al., 2022).

If we want to briefly summarize the existing research results in the narrower topic, we could say that the companies are currently in an experimental phase and the theoretical tone is much stronger than the illustration of practical experiences. The future development of the technology also raises many questions, an integral part of which is the possible reduction or partial displacement of the human resources working in the industry. Based on the overall picture, was clearly confirmed, that the proportion of the results that analyse the specific application is relatively low, so this territory is an absolute research gap to be filled (Jagatheesaperumal et al., 2021; Kalkha et al., 2023; Li et al., 2023; Vilas-Boas et al., 2023).

LOGISTICS AI USE IN ZALA COUNTY

In the section, the main findings and conclusions of the qualitative sampling will be highlighted which was conducted with the managers using AI enterprises in the county. During the qualitative sampling the paper reached the previously planned aim and with a total of 10 company leaders were interviews conducted successfully. The location of the interviews was the headquarters of the given companies where only the interviewee and the author were present. The interviews were conducted in the same structure and the managers did not receive the interviews before the sampling, the questions were only known during the interviews. As was described in the methodology, semi-structured interviews were conducted that had the same basic questions, but the interviewees were able to answer according to their own responsibilities and experiences. The main elements of the interviews are summarized in Table 1. The timeframe of each interview was different but was typically between 30 and 60 minutes. Only one expert at a time was interviewed. During the interview, the author asked the questions in order, after which the interviewee's answers were recorded in writing and a sound recorder for each question. Due to the time factor, handwritten materials were created from which a transcript was made. Before scheduling the interview, basic data from the companies were asked which is summarized in the following table.

Table 1: Qualitative interviews among enterprises of Zala County

Number	Industry	Employees	Position	Date
1.	Printing industry	73	Owner	09/02/24
2.	Game cooler (Deer, wild boar etc.)	24	Technical director	09/02/24
3.	Wood and furniture cluster	Na	Cluster director	13/03/24
4.	Wood industry	252	Logistics Manager	13/03/24
5.	Clothing	60	Site Manager	19/03/23
6.	Electronic assembly	cca 40.000	Logistics Manager	21/03/24
7.	Hospitality	50	IT specialist	22/03/24
8.	Automotive industry	140	IT specialist	22/03/23
9.	Tool manufacturing	51	Managing director	26/03/23
10.	Electronic assembly	cca. 10.000	Production leader	31/03/23

(Source: Own editing)

Table 2: Areas of AI use within logistics among Zala County enterprises

Number	Industry	CRM system	HR	Predictive analysis	Other
1.	Printing industry	**X**			
2.	Game cooler (Deer, wild boar etc.)	**X**			
3.	Wood and furniture cluster			**X**	
4.	Wood industry		**x**		
5.	Clothing	**X**			
6.	Electronic assembly	**X**	**x**	**X**	
7.	Hospitality				**x**
8.	Automotive industry	**X**			
9.	Tool manufacturing	**X**	**x**		
10.	Electronic assembly	**X**	**x**		

(Source: Own editing)

One of the primary questions of the semi-structured qualitative interviews was related to the topic of which area companies use AI the most within logistics. Within the answers, the aggregated result can be found in Table 2.

A similar result was obtained regarding the application territory as in the case of the Pest County research, i.e. a significant part of the enterprises use AI in the field of HR or CRM to maintain specific chatbots or to automate administrative processes, or in some cases it is used as an assistant in the given area. The predictive forecasting was in this case also limited to the trend estimation of maintenance logs. At one catering company, the technology was used to design certain visual elements. Taken together, perhaps the biggest difference in the application territory is that there were a smaller number of applications in *other* territories (only 1 case) than in the capital region (Pest County).

The second group of questions of the semi-structured qualitative interview concerned the effectiveness of the logistics AI application, within which the main results are illustrated in Table 3.

Table 3: Effectiveness of AI use within logistics among Zala County enterprises

Number	Industry	Effective	Rather effective	Rather Ineffective	Ineffective
1.	Printing industry		**x**		
2.	Game cooler (Deer, wild boar etc.)				**x**
3.	Wood and furniture cluster			**X**	
4.	Wood industry		**x**		
5.	Clothing		**x**		
6.	Electronic assembly	**X**			
7.	Hospitality		**x**		
8.	Automotive industry	**X**			
9.	Tool manufacturing		**x**		
10.	Electronic assembly		**x**		

(Source: Own editing)

As can be seen from the answers, the application of AI to support logistics ERP systems shows a completely mixed picture. Originally, many businesses expected a completely seamless application but in practice, the projects revealed several important problems:

- Strategically, the development did not bring the expected comparative advantage,
- The invested resource is much higher than the realized profit,
- Compatibility issues/Inappropriate foundations,
- Inadequate design, consumer needs are not met by the technology,
- Unnecessary automation/improper exploitation of AI,
- Prolonged maintenance, maintenance difficulties.

These problems were also fully apparent in both samples, but the Zala County research added additional problems to the previously known problems which were the following:

- A respondent indicated that certain HR-related tasks were automated with the help of AI but the Hungarian legal system requires the handwritten signature of the manager on the contracts, so the actual task is simply not compatible with the legal environment.
- Another respondent indicated a similar problem as in the case of the Pest County sampling - the need for human resources for the given task despite automation - but the representative of the Zala County company added that the company had downsized over time thanks to AI, entrusting the project to in its success. However, since AI does not bring the previously imagined automation, the remaining human resources are assigned a much larger amount of tasks, thus leading to significant dismission.

In the framework of the current study, other technology-related problems were also identified. Within this, the applied algorithm was sensitive to certain images and formats, it did not give the searched terms for a given text search and if yes then returned them in a different language sometimes. These failures have a very long optimization time which is still not a guarantee of correct operation. In connection to the first research question, a much more negative overall picture was observed in the case of Zala County businesses in comparison with the Pest Count analysis which can be strongly attributed to the fact that local companies have fewer resources available in terms of testing, and would need much more ready-made solutions. Of course, this is not an empirically proven statement at the moment, simply based on the qualitative results which set a new direction that should also be examined in the future.

Another important part of the research was the definition of the strategic role of AI among the interviewed companies. The answers received were also different in this case –more respondents considered the use of AI as a less strategic factor but it is worth comparing these answers with the profile of the responding companies. Those respondents, who have large resources, keep their logistics problems at a low level and constantly looking for new logistics solutions (there were 2 such respondents), were typically more committed to the use of logistics AI. In their case, the appropriate use of AI can be a strategic factor.

In the case of three enterprises, a new strategic approach was also identified, the essence of which was that AI does not strategically replace human resources but it can help in certain work processes quite strongly, so that these processes can be accelerated and optimized. From this point of view, the use of AI can be an absolute competitive factor, even at the SME level. (!) In relation to the strategic importance, the above-mentioned 2 companies, which have a wide range of resources, and the last 3 companies, which instead of replacing human resources, use AI to facilitate the work of their employees, identify AI as a competitive, strategic factor. Compared to them, the remaining 5 enterprises deal with technology more experimentally and do not consider it of outstanding importance at the moment.

Based on the obtained results, a realistic picture of future research directions was formed, an integral part of which is the conduct of a quantitative study. Within this, the construction and integration of an SEM model from a previous Zala County logistics IT efficiency study has already been defined (Szabó et al., 2024). Based on the answers, the following dimensions and factors should be examined using the previous framework:

- the current situation – resources and AI use
- logistics and AI problem types
- the caused damages
- needed developments for solving the problems

Based on the answers, these are the factors that significantly influence the strategic importance, role, planning and success of AI projects among the interviewed enterprises.

DISCUSSION

Within the section, the theoretical background will be compared with the practical results. This is especially important from the point of view of the local companies since, as already mentioned, the previous results of the literature, show little practical implementation, and we rather get an insight into the possibilities of theoretical implementation. This research gap is also reflected in the results collected during the study. One of the most important realizations - when comparing practice and theory was that in theory, we find many implementation possibilities in the field of AI (e.g. predictive analysis, inventory management optimization, other automation) but, despite this, only a fraction of them is actually used (in reality).

Nominally, we find the vast majority of implementations in the areas of HR, maintenance and CRM. The best way to compare the results with the literature is that the previous results show a model that works in theory, which is not sure can be applied in practice. On the other hand, the current experimental era is presented in the literature as it is in the primary data collection part of this research. The third important part which has to be compared is the efficiency of use. Within this, most previous research completely ignores the typical failures in AI, compared to which the current paper identified a lot of issues. In the framework of this finding, we can say that the technology was previously considered an almost error-free solution, but it was tainted several problems by the present research with, for which businesses must be able to consciously prepare.

The comparative analysis between theoretical possibilities and practical implementations reveals several significant points that merit discussion. Firstly, while theoretical models highlight a wide range of AI applications in logistics, including predictive analysis, inventory management, and other automation processes, the practical use observed in Zala County is predominantly in HR, CRM, and maintenance. This disparity underscores a gap between theoretical potential and actual implementation. The literature often presents an idealized view of AI capabilities, suggesting seamless integration and operation. However, the practical experiences documented in this study highlight numerous challenges, including strategic misalignment, high resource investment with low returns, compatibility issues, and legal constraints. These practical challenges are not widely discussed in theoretical studies, which tend to focus on the capabilities and benefits of AI without adequately addressing the real-world difficulties businesses face during implementation.

Secondly, the effectiveness of AI applications in Zala County shows a mixed picture. While some enterprises reported significant benefits from AI, such as enhanced efficiency in HR and CRM processes, others encountered substantial issues, including prolonged maintenance periods and unmet consumer needs. These findings contrast with the often optimistic projections in theoretical literature, where AI is portrayed as a near-error-free solution. The study's identification of specific problems, such as the sensitivity of algorithms to certain inputs and the legal incompatibility of automated processes, adds a critical dimension to the understanding of AI implementation in logistics. Moreover, the qualitative nature of the study allowed for an in-depth exploration of these issues, revealing that the successful implementation of AI is contingent upon several factors, including the preparedness of the organization, the adaptability of the workforce, and the robustness of existing IT infrastructure.

Thirdly, the strategic importance of AI varies significantly among enterprises in Zala County. Larger companies with more resources view AI as a strategic asset that can enhance competitiveness by optimizing processes and supporting decision-making. Conversely, smaller enterprises with limited resources tend to treat AI as an experimental tool rather than a strategic necessity. This divergence suggests that the strategic value of AI is closely linked to the resource availability and the specific needs of the business. The literature often generalizes the strategic importance of AI across different business contexts, but this study highlights the nuanced reality that smaller businesses may not yet see AI as critical to their operations. Additionally, the qualitative interviews revealed that while AI has the potential to offer significant strategic benefits, the lack of ready-made solutions and the high costs associated with customization and maintenance pose considerable barriers for smaller enterprises.

Another crucial aspect that emerged from the study is the need for conscious strategic planning and preparation for AI-related challenges. Businesses must anticipate potential issues such as prolonged optimization times, the necessity for legal compliance, and the integration of AI with existing systems. The study found that companies often underestimated these challenges, leading to frustrations and unmet expectations. This finding underscores the importance of a holistic approach to AI implementation, where technical capabilities are matched with strategic foresight and resource allocation.

Furthermore, the study's findings suggest that there is a critical need for future research to focus on quantitative analyses using models like SEM to better understand the causal relationships between AI implementation, resource availability, and strategic outcomes. The qualitative findings from Zala County suggest that resource constraints play a significant role in the effectiveness and strategic value of AI. Quantitative research could provide more definitive insights into these relationships

and help identify strategies for overcoming the challenges faced by smaller enterprises. Specifically, a quantitative approach could validate the qualitative insights by measuring the impact of specific factors on AI success, such as the level of investment in training, the quality of IT infrastructure, and the extent of strategic planning.

In addition, the study highlights the potential for AI to serve as a competitive factor, particularly for companies that use it to enhance rather than replace human resources. Some enterprises have found that AI can significantly streamline processes and support decision-making, thereby enhancing overall productivity and competitiveness. This strategic use of AI, where it complements human capabilities, appears to be a promising direction for businesses looking to leverage AI without the associated risks of workforce displacement.

In summary, the study provides valuable empirical evidence that complements and challenges existing theoretical frameworks on AI in logistics. Highlighting the practical challenges and strategic considerations unique to Zala County enterprises contributes to a more nuanced understanding of AI implementation in real-world settings. Future research should continue to explore these themes, integrating both qualitative and quantitative approaches to build a more comprehensive picture of AI's role in logistics. This dual approach will be essential in bridging the gap between theory and practice, ensuring that AI technologies are implemented in ways that are both effective and sustainable for businesses of all sizes.

CONCLUSIONS

In the framework of the current study, the main aim was the examination of AI use within the IT support of logistics. The paper was the second step of an already-started research, on the above-mentioned topic will be examined in Hungary. In the first half of the analysis, the existing literature was represented during which it became visible that there are already many results in the field of theoretical approaches, but the company application has been investigated by relatively few. Since this research was done as a pilot, a small sample was used in the qualitative research framework, with which the paper aimed to determine cause-and-effect relationships.

In connection with research question Q1, local businesses mostly use artificial intelligence in logistics in the fields of CRM, HR and maintenance. The effectiveness of these implementations showed a mixed picture within which several new challenges were identified. In this research question, a much more negative overall picture was observed in the case of Zala County businesses in comparison with the Pest Count analysis which can be strongly attributed to the fact that local companies have fewer resources available in terms of testing, and would need much more ready-made solutions.

In the case of the second research question, the final result was also versatile. The prosperous companies (which are rich in resources) and those enterprises which use AI as assistance, treat the technology as a highlighted strategic factor while the remaining 5 respondents apply it as an experiment. This result, highly contributes to the future research directions within a quantitative, SEM model research was identified. In the framework of the next step the current situation, logistics and AI problem types, caused damages and development needs will be examined as cause and effect factors in the mirror of AI success.

In terms of proposals, it is definitely worth emphasizing that businesses should be able to consciously prepare for AI problems and their possible optimization costs. Similarly, they should place greater emphasis on conscious strategic planning. In addition, it also appears that the use of AI is increasing, so it will be highly important for local businesses to learn to use it and plan it into their everyday processes.

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IT PODRŽANA LOGISTIČKA REŠENJA U ŽUPANIJI ZALA

Rešenja industrije 4.0, kao što je upotreba veštačke inteligencije, postaju sve vidljivija u svakodnevnim logističkim procesima. Mnoge publikacije su se već bavile pitanjem koje tehnološke inovacije bi mogle da se uvedu kako bi se poboljšao protok materijala, ali relativno manji broj se bavio merama u kojima su ova teorijska rešenja prisutna i u praksi. U vezi sa gore navedenim jazom, ovo istraživanje ima za cilj da ispita efikasnost i uticaj upotrebe veštačke inteligencije u oblasti logistike. Ovaj rad je nastavak studije na temu, jer je upotreba logističke veštačke inteligencije već analizirana u okrugu Pešta, u okviru ovog smera istraživanja. S obzirom na to da je ova studija još uvek drugi korak već započetog istraživačkog rada, predmetna studija ne pokušava da izvuče zaključke koji vode ka generalizaciji, već ima za cilj da izvuče uzročne zaključke pilotske prirode. U istraživačkim alatima, rad koristi kvalitativni dizajn iz prethodne studije (primenjen na drugoj geografskoj teritoriji – okrugu Zala), ali istovremeno ispituje druge metode analize poput SEM modeliranja kao potencijalnog alata za integraciju.

Ključne reli: Logisika; Veštačka inteligencija; ERP sistem; Strategija; Planiranje.