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DIGITALIZATION POTENTIAL OF LOGISTICS OPERATOR

The article investigates the methodological aspects of the management process in the field of the logistics customer services in terms of improving its digitalization potential. The phenomenon of digitalization has been studied insufficiently and, according to some foreign authors, it has significant potential for development from the theoretical perspective.

However, the digitalization of logistics in Ukraine is only gaining popularity in the scientific community. Consequently, a large number of domestic enterprises have certain difficulties while they are implementing innovations and digital solutions into the optimization of their activity. This actualizes the problems of this study as well as determines the aim and the practical tasks of the given article.

In particular, it has been determined that the potential for digitalization of logistics processes is manifested primarily in increasing the management quality and efficiency, the possibility of timely correction of threats and risks that arise, and in facilitating analytical processing and obtaining more accurate assessment of large amounts of information.

To identify the digitalization potential of the enterprise logistics, the article identifies the key changes that the logistics operator delivering goods within the territory of Ukraine based on the implementation of a range of digitalization tools may deal with.

Thus, the primary optimization measures taken in the process of implementing digitalization at the researched enterprise are the following: digitalization of document circulation at the enterprise, the process of loading and unloading delivery vehicles during the working day, the system of cargo placement in the warehouse. These measures will optimize various processes and reduce the influence of the human factor. Taken together, this will speed up the processes and increase the quality of their implementation by reducing the number of errors and delays.

To optimize intra-warehouse movements and the delivery process by digitalization of operating processes carried out by the logistics operator, it is advisable to prioritize the implementation of not only electronic document management system but also the following digital tools: RFID systems – for the efficient placement of goods in the warehouse and quick determination of their location, based on the use of RFID tags; GPS tracking – to increase the efficiency of vehicle use and reduce the cost of vehicle tracking, based on the use of GPS trackers; scale scanners as advanced weighing and measuring technologies that scan the load, determine its weight and volume, display the results and send them to the system.

The authors applied the AHP method to justify the application sequence of each technology and form an optimal digitalization plan as exemplified by the logistics operator under investigation. Using a multicriteria approach to assess the feasibility of implementing each digital solution based on the survey data, the respondents of which include company

executives and experts of the considered domestic logistics operator, the optimal sequence of introducing digital technologies in this company has been identified.

Therefore, it is recommended to introduce the RFID system first. Then, the electronic document management should be launched. After that, it is recommended to introduce a scale scanner. Finally, the GPS system should be applied. Using the recommended algorithm for modeling the digitalization process and key changes that may occur at the investigated logistics operator resulting from digitalization tools set implementation, will allow domestic logistics operators to make optimal decisions.

Key words: digital technologies, logistics customer services, AHP analysis, RFID system, GPS system.

Statement of the problem

In today's world, one of the best and most effective ways to improve and enhance the efficiency of the enterprise is the digitalization of processes by using different technical innovations. Digitalization allows structuring the actions and steps of the enterprise on the way towards the use of the advanced technologies to optimize activities and get the most out of their implementation. At the same time, a large number of enterprises, including domestic ones, have certain difficulties in implementing and evaluating all risks and advantages of digital technologies to optimize their activities. This is due to insufficient research on the potential of digitalization, its methodology and the development of certain algorithms. The study of this phenomenon on the example of a domestic logistics operator will allow enterprises working in the field of logistics to more effectively use the potential of digitization.

Analysis of recent research and publications

The phenomenon of digitization is still insufficiently studied, but has significant methodological potential for development. Digitalization is a process of digital technology introduction into the activity for the increase of its efficiency. At the present stage of development of the economy of Ukraine, the applied aspect of digitalization, and hence, the analysis of recent research and publications on the outlined subject, have become especially relevant.

The aspects of the digital economy formation and development are covered in the works of such foreign researchers as P. Hagen, W. Isaacson, T. Scholz, A. Schwienbacher, B. Larralde, A. Toffler, H. Toffler [1–5], who emphase the need and feasibility of using innovative solutions in business and management. In recent years, the managers, including L. Anderson, L. Heyden, V. Bamberger, B. Galinskaya, A. Magruk [6–9], have been actively researching the concept of digitalization in the logistics sector. In particular, they thoroughly investigated the following aspects: the effectiveness of digitalization of logistics processes, features of various digital technologies in the logistics sector, the prospects for digitalization of logistics in the near future.

The Ukrainian specialists, in particular Y. Bazhal, K. Kononova, N. Kraus, Ye. Krykavskyi and O. Pokhylchenko [10–15], have justified the conceptual approaches of digital economy, its role and perspectives.

Digitalization of logistics in Ukraine is only gaining popularity in the scientific community and is the most actively discussed among business practitioners. The digital economy is changing and new digital technologies emerge. This necessitates constant research into both existing and potential transformations.

Formulation of objectives

This article aims to study the theoretical and methodological aspects of managing the process of logistics customer services and justify the possibility of improving their digitalization potential. Achieving the goal will contribute to the development of recommendations for optimization of the enterprise logistics services based on the analysis of the digitalization possibilities as exemplified by "UKR Logist" Ltd, the logistics operator in the market of logistics.

Presenting of main material

Due to the popularization of Internet resources in the world, e-commerce is developing rapidly, various business processes are changing and improving through the use of advanced digital technologies. Innovations allow companies to expand their potential significantly and ensure competitiveness in today's market. Besides, digital technologies optimize and improve the quality of enterprise activity, reduce execution time and costs of creating goods and services.

The introduction of digital technologies into the enterprise activity has been called "digitalization" and has recently developed its methodological potential significantly. Digitalization involves not only the selection and implementation of a particular technology in the enterprise, but causes changes in the organizational aspect of the enterprise management and adjustment of its ideology to the modern market requirements [16].

Digitalization is relevant to all the activities, including the logistics sector. After all, effective optimization of production, movement and sales requires a high level of information exchange among the participants of the logistics processes. The potential for digitalization of logistics processes is manifested primarily in the increase of the speed and efficiency of management, the possibility of timely correction of arising threats and risks, the facilitation of analytical processing and obtaining a more accurate assessment of large database of information [17].

The means of digitalization at the enterprise include:

– the use of the latest information processing technologies, such as electronic document management, big data, the Internet of Things, etc.;

– digitalization of individual operations, including logistics (tracking of vehicles, cargo, route formation, etc);

– optimization of the enterprise activity and management through arranging the cross-docking in warehouses, next day delivery, logistics of recycling;

– the use of modern technologies: drones, robots, artificial intelligence, RFID tags, GPS trackers, automated trucks, 3D printing.

– cooperation and collaboration with other companies: joint fleet, warehouse, crowdsourcing [16].

Therefore, to identify the digitalization potential of the logistics service processes, it is advisable to model key changes that may occur in the enterprise operating in the Ukrainian logistics services market under the conditions of implementing a set of measures aimed to introduce digitalization into the existing logistics operator under an assumed name "UKR Logist" Ltd (in order to preserve confidentiality in the article, the real name of the company is replaced by an invented name), which deals with the delivery of goods across the territory of Ukraine.

The detailed analysis of logistics processes and operations that take place at "UKR Logist" Ltd allows identifying "weaknesses" in the system of logistics customer service selected for the study of the enterprise (Fig. 1). These include the process of forming routes for each driver, the process of loading and unloading vehicles, as well as the systematization and placement of goods in the warehouse. It should also be noted that these operations are highly dependent on the the human factor as most operations involving the delivery of goods are performed manually. This often leads to confusion and errors in the placement of goods in the warehouse, the distribution between the directions of further transportation or between branches of the company. This actualizes the study of the digitalisation potential and implementation of new technologies to find the ways to solve the problems of failures and errors in the studied enterprise activity.

Thus, the primary measure involved in the process of launching digitalization at the enterprise under research is to choose digitalization of document circulation at the enterprise, the process of loading and unloading vehicles during delivery and handling during the working day, as well as the system of cargo placement in the warehouse. These measures will optimize various processes and reduce the influence of the human factor. Taken together, this will reduce the time of processes and increase the quality of their implementation by reducing the number of errors and delays (Fig. 2).

To optimize intra-warehouse movements and the delivery process by digitalization, it is advisable to prioritize the implementation of the following digital tools:

1. Electronic document management will not only speed up delivery and handling time, but also eliminate the need to manually keep a large number of documents and their circulation in the company in paper form, which helps to preserve the environment, and eliminates the need for archives, as documents will be stored on servers or cloud resources.

2. RFID systems – for efficient placement of goods in the warehouse and quick determination of their location, based on the use of RFID tags. Such labels contain a microchip that will allow you to track the cargo in the online warehouse, and the system will indicate exactly where the cargo is. The RFID system will schematically divide the warehouse into sectors and indicate the point on the tablet, according to which the location of the desired cargo will be determined.

3. GPS tracking – to increase the efficiency of vehicle use and reduce the cost of vehicle tracking, based on the use of GPS-trackers, which will determine the location of the car and indicate it in the system. For this purpose, you can use a certain type of RFID tags.

4. Scanner scales as advanced weighing and measuring technologies that scan the load, determine its weight and volume, display the results and send them to the system. Also, to optimize the formation of routes, this process should be more automated. For example, the system automatically divides the city area taking into acount the number and the capacity of vehicles, and cargo is distributed according to different. The database contains all the data on the streets of each sector and possible transportation routes.

At the same time, the simultaneous implementation of all the suggested digital solutions is not only a technically difficult task, but also financially limited. Therefore, the next step is to justify the sequence of application of each technology and form an optimal plan for digitalization at "UKR Logist" Ltd. Since the implementation of a particular technology is not only quantitative, but also requires the qualitative expression of certain criteria, there is a need to apply multiple-criteria decision analysis (MCDA) to find the optimal digitalization plan.

Since 1960s MCDA has been extensively used in management science as a tool for evaluating options in decisions, which involve the achievement of multiple objectives [18]. There are variety of approaches and methods which are represented by different schools for solving MCDA problems. But in the case when the available criteria cannot be formalized in the form of specific criterion functions, but the expert can set his preferences based on pairwise comparison of the criteria and/or the alternatives in order to make the best decision among alternatives, the most appropriate ones are Analytic Hierarchy Process (AHP) and Analytic Network Process (ANP) [19].

According to [20–22] AHP and ANP are essentially ways to measure intangible factors in decision-making situations when subjectivity exists by using pairwise comparisons with judgments that represent the dominance of one element over another with respect to a property that they share. ANP is a more general approach, based on the description of the problem by means of a network instead of a hierarchy as in AHP. On the other hand, ANP is also more complex in its application (Table 1).

Thus, due to the fact that AHP is widely used in practice and is being actively developed by scientists all over the world, allows taking into account subjectivity exists to find an optimal solution, receives a positive assessment of people with the out coming priorities and at the same time requiring less costs and efforts comparing with ANP, the choice of AHP approach in this work seems to be more reasonable, and more preferable, given also the small number of analyzed alternatives.

Thus, to evaluate the feasibility of implementing each digital solution we have chosen the following criteria: cost of equipment, impact on efficiency, flexibility, controllability, reliability, system integration. The value and level of each criterion of the proposed digital technologies are based on the data obtained from a survey, the respondents of which include company executives and experts in the implementation of digital technologies into the business processes (Table 2).

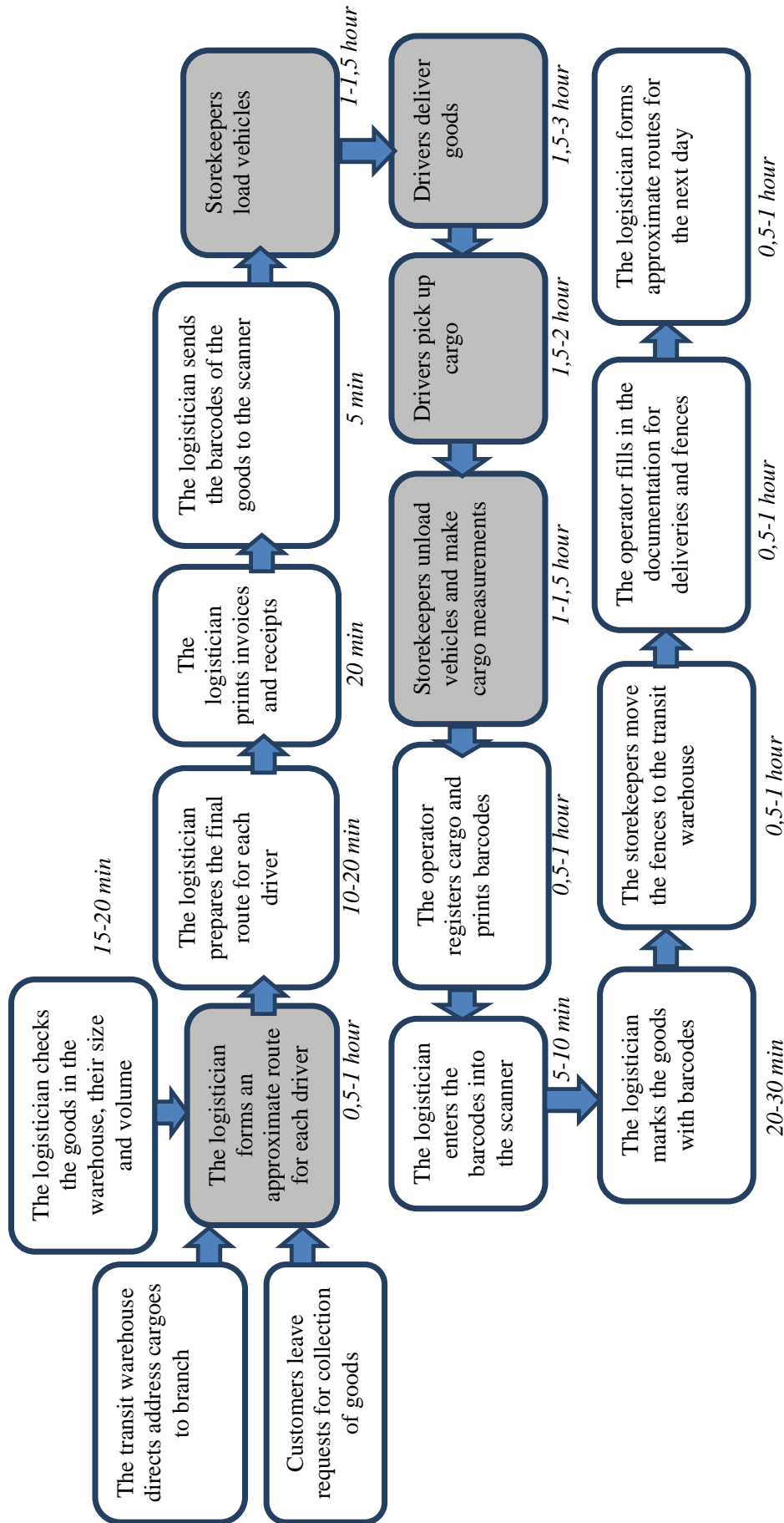*Fig. 1. Logistics processes at UKR Logist Ltd*

Source: own development.

Fig. 2. Modification of logistics processes at UKR Logist Ltd after digitalization of document circulation, delivery, loading and unloading of vehicles

Source: own development

Table 1

Comparing AHP and ANP: An Application of Multiple-criteria decision analysis (MCDA)

Comparing elements	AHP	ANP
Variety of decision-making situations where the method works	Wide variety of decision-making situations which can be structured hierarchically*	No restrictions where you can use this method
Level of complexity of the application	Simple calculation of results, possible using Excel sheet	Explanation of concept & process to management extremely challenging, requires a specific software to calculate results
Level of understanding of specific problem	Pair-wise comparison is a quite artificial way of comparing a set of items	Ideal tool to gain deeper understanding of a specific problem and its relation to related factors
Plausible results	People usually agree with the out coming priorities	Verification of result due to feedback loops and interrelations impossible

* The applications of AHP to complex decision situations have numbered in the thousands, and have produced extensive results in problems involving planning, resource allocation, priority setting, and selection among alternatives. Other areas have included forecasting, total quality management, business process reengineering, quality function deployment, and the balanced scorecard.

Source: made on the basis of [20, 22].

Table 2

Characteristics of the proposed digital solutions

Criteria	Electronic document management	RFID-system	GPS-tracking	Scanner-weight
Cost of equipment, UAH	77 810	80 121	7 400	70 000
Influence on process efficiency	significant	very significant	insignificant	significant
Impact on process flexibility	very significant	very significant	very significant	significant
Influence on process controllability	very significant	very significant	significant	very significant
Impact on process reliability	significant	very significant	insignificant	significant
Impact on process integration	very significant	very significant	very significant	significant

Source: own research.

According to the AHP method, one should perform the following sequence of actions:
Step 1. Build a matrix for determining the priorities of each criterion (Table 3).

Table 3

Determining the priority of each criterion

	The cost of equipment	Impact on efficiency	Flexibility	Controll-ability	Reliability	Integration
The cost of equipment	1	1/7	1/5	1/4	1/7	1/7
Impact on efficiency	7	1	3	7	1	2
Flexibility	5	1/3	1	5	1/4	1
Controllability	4	1/7	1/5	1	1/7	1/5
Reliability	7	1	4	7	1	3
Integration	7	1/2	1	5	1/3	1

Source: own research.

The survey registered 15 local logistics operators of various sizes and researchers from 5 local universities – a total of 43 people were interviewed. The survey was conducted by questioning managers and scientists who evaluated the feasibility of each digital technology on the efficiency of logistics processes on a 10-point scale. The results of the questionnaire were summarized and the average score was determined accordingly. The analysis of the cost of digital technologies for implementation was determined according to the current digitalization programs offered on the domestic market and the cost of the necessary equipment [23–28].

The priority of each criterion is determined in the ratio between themselves on a scale from 1 to 9 following the increase in the priority of the criterion (in lines) over each other criterion. For example, the cost of equipment has a lower priority than other criteria, because when implementing digital technologies, the efficiency and reliability of the technology is more important. Similarly, the priority of digital proposals is determined in the context of each comparison criterion (Table 4).

Table 4

The matrix of priorities of the proposed digital solutions

The cost of equipment				
	Electronic document management	RFID system	GPS tracking	Weight scanner
1	2	3	4	5
Electronic document management	1	0.33	0.14	0.25
RFID system	3	1	7	3
GPS tracking	7	0.14	1	0.33
Weight scanner	4	0.33	3	1
Together	15	2	11	5
Impact on efficiency				
	Electronic document management	RFID system	GPS tracking	Weight scanner
Electronic document management	1	0.2	7	2
RFID system	5	1	7	5
GPS tracking	0.14	0.14	1	0.33
Weight scanner	0.5	0.2	3	1
Together	6.6	1.5	18	8.3
Flexibility				
	Electronic document management	RFID system	GPS tracking	Weight scanner
Electronic document management	1	0.25	6	7
RFID system	4	1	7	8
GPS tracking	0.17	0.14	1	4
Weight scanner	0.14	0.13	0.25	1
Together	5.31	1.52	14.25	20
Controllability				
	Electronic document management	RFID system	GPS tracking	Weight scanner
Electronic document management	1	4	0.2	0.25
RFID system	0.25	1	3	0.33
GPS tracking	5	0.33	1	0.33
Weight scanner	4	3	3	1
Together	10.25	8.33	7.20	1.92
Reliability				
	Electronic document management	RFID system	GPS tracking	Weight scanner
Electronic document management	1	0.25	5	0.5
RFID system	4	1	7	3
GPS tracking	0.2	0.14	1	0.25

1	2	3	4	5
Weight scanner	2	0.33	4	1
Together	7.2	1.73	17	4.75
Integration				
	Electronic document management	RFID system	GPS tracking	Weight scanner
Electronic document management	1	4	7	6
RFID system	0.25	1	1	5
GPS tracking	0.14	1	1	4
Weight scanner	0.17	0.2	0.25	1
Together	1.56	6.2	9.25	16

Source: own development.

By analogy with Table 3, Table 4 takes into account the ratio of different decisions in the context of each criterion.

Step 2. Calculate the priority of each criterion and determine their amount (Table 5).

Table 5

The priorities of the criteria are calculated

	The cost of equipment	Impact on efficiency	Flexibility	Controllability	Reliability	Integration
The cost of equipment	1	0.14	0.2	0.25	0.14	0.14
Impact on efficiency	7	1.0	3	7	1.0	2
Flexibility	5	0.33	1	5	0.25	1
Controllability	4	0.14	0.2	1	0.14	0.2
Reliability	7	1.0	4	7	1.0	3
Integration	7	0.5	1	5	0.33	1
Together	31	3	9	25	3	7

Source: own development.

Step 3. Based on the received data on criteria priority we calculate the standardized values of criteria priority (Table 6).

Table 6

Matrix of standardized values of priority criteria

	The cost of equipment	Impact on efficiency	Flexibility	Controllability	Reliability	Integration	Priority indicator
The cost of equipment	0.03	0.05	0.02	0.01	0.05	0.02	0.03
Impact on efficiency	0.23	0.32	0.32	0.28	0.35	0.27	0.29
Flexibility	0.16	0.11	0.11	0.20	0.09	0.14	0.13
Controllability	0.13	0.05	0.02	0.04	0.05	0.03	0.05
Reliability	0.23	0.32	0.43	0.28	0.35	0.41	0.33
Integration	0.23	0.16	0.11	0.20	0.12	0.14	0.16
Together	1	1	1	1	1	1	

Source: own development.

The standardized values of each criterion are calculated by dividing the values of each ratio by the sum of the the criterion priorities in the column (data from Table 5). The priority of each criterion is calculated as the ratio of the sum of standardized values in the line and the number of criteria:

$$\text{Priority indicator}_{cost} = \frac{0.03+0.05+0.02+0.01+0.05+0.02}{6} = 0.03$$

According to the results obtained the most important criterion for choosing a digital solution is its impact on efficiency and reliability. while the least important ones are cost and controllability. The low importance of the cost of digital supply is due to the payback of digital technologies and the efficiency of their implementation.

Step 4. Form a matrix of standardized values of priority of digital solutions in a similar way (Table 7).

Table 7

Matrix of standardized values of decision priorities

The cost of equipment					
	Electronic document management	RFID system	GPS tracking	Weight scanner	Priority indicator xy
1	2	3	4	5	6
Electronic document management	0.07	0.18	0.01	0.05	0.08
RFID system	0.2	0.55	0.63	0.65	0.51
GPS tracking	0.47	0.08	0.09	0.07	0.18
Weight scanner	0.27	0.18	0.27	0.22	0.23
Together	1	1	1	1	
Impact on efficiency					
	Electronic document management	RFID system	GPS tracking	Weight scanner	Priority indicator xy
Electronic document management	0.15	0.1	0.39	0.24	0.23
RFID system	0.75	0.6	0.39	0.6	0.6
GPS tracking	0.02	0.1	0.06	0.04	0.05
Weight scanner	0.08	0.1	0.17	0.12	0.12
Together	1	1	1	1	
Flexibility					
	Electronic document management	RFID system	GPS tracking	Weight scanner	Priority indicator xy
Electronic document management	0.19	0.16	0.42	0.35	0.28
RFID system	0.75	0.66	0.49	0.4	0.58
GPS tracking	0.03	0.09	0.07	0.2	0.1
Weight scanner	0.03	0.08	0.02	0.05	0.04
Together	1	1	1	1	
Controllability					
	Electronic document management	RFID system	GPS tracking	Weight scanner	Priority indicator xy
Electronic document management	0.1	0.48	0.03	0.13	0.18
RFID system	0.02	0.12	0.42	0.17	0.18
GPS tracking	0.49	0.04	0.14	0.17	0.21
Weight scanner	0.39	0.36	0.42	0.52	0.42
Together	1	1	1	1	

1	2	3	4	5	6
Reliability					
	Electronic document management	RFID system	GPS tracking	Weight scanner	Priority indicator xy
Electronic document management	0.14	0.14	0.29	0.11	0.17
RFID system	0.56	0.58	0.41	0.63	0.54
GPS tracking	0.03	0.08	0.06	0.05	0.06
Weight scanner	0.28	0.19	0.24	0.21	0.23
Together	1	1	1	1	
Integration					
	Electronic document management	RFID system	GPS tracking	Weight scanner	Priority indicator xy
Electronic document management	0.64	0.65	0.76	0.38	0.6
RFID system	0.16	0.16	0.11	0.31	0.19
GPS tracking	0.09	0.16	0.11	0.25	0.15
Weight scanner	0.11	0.03	0.03	0.06	0.06
Together	1	1	1	1	

Source: own development.

The table shows that the introduction of the RFID system has the highest priority in terms of cost (0.59), efficiency (0.6), flexibility (0.58) and reliability (0.54). According to the criterion of controllability, the highest priority is given to the use of a scanner scale – 0.42. According to the criterion of integration, the highest priority is indicated by the introduction of the electronic document management system – 0.6.

The final decision on the use of a particular digital technology should be made based on the calculation of the overall priority for each decision. This indicator is calculated by adding the products of the priority of the decision according to a certain criterion and the priority of the criterion:

$$Priority_{EDM} = 0.03 \times 0.08 + 0.29 \times 0.23 + 0.13 \times 0.28 + 0.05 \times 0.18 + \ldots + 0.33 \times 0.17 + 0.16 \times 0.6 = 0.27.$$

$$Priority_{RFID\ system} = 0.03 \times 0.51 + 0.29 \times 0.6 + 0.13 \times 0.58 + 0.05 \times 0.18 + \ldots + 0.33 \times 0.54 + 0.16 \times 0.19 = 0.49.$$

$$Priority_{GPS\ trackingи} = 0.03 \times 0.18 + 0.29 \times 0.05 + 0.13 \times 0.1 + 0.05 \times 0.21 + \ldots + 0.33 \times 0.06 + 0.16 \times 0.15 = 0.09.$$

$$Priority_{scanner\ scale} = 0.03 \times 0.23 + 0.29 \times 0.12 + 0.13 \times 0.04 + 0.05 \times 0.42 + \ldots + 0.33 \times 0.23 + 0.16 \times 0.06 = 0.16.$$

Therefore, it is necessary to implement the RFID system first, then to organize the application of the electronic document management system, then start using scanner scales and launch GPS system (Fig. 3).

Fig. 3. The sequence of implementation of digital technologies at "UKR Logist" Ltd

Source: own development.

Following this sequence, the enterprise has the opportunity to decrease not only financial risks, but also risks associated with technical difficulties of the simultaneous launch of digital technologies.

Conclusions

The study of theoretical and methodological aspects of the digitalization potential of logistics processes allows us to highlight the following main results:

- digital framework for logistical business especially in the field of logistics customer services have been further developed. It has been determined that the effective digital optimization of the processes of route formation, loading and unloading of vehicles, as well as storage and placement of goods in the warehouse is manifested primarily not only in decreasing the failures and errors at each stage, speeds up processes but also improves their quality. In particular, the article identifies and visualizes the key changes that the logistics operator delivering goods within the territory of Ukraine based on the implementation of a range of digitalization tools may deal with such as RFID-systems, GPS-trackers, scale scanners and electronic document management system.

- it was found that one of the most effective ways to build a digitalization plan for an enterprise or its individual business processes is application one of the multiple-criteria decision analysis (MCDA) methods, namely AHP. Due to the fact that AHP allows taking into account not only quantitative, but also qualitative expression of certain criteria to find an optimal solution, and at the same time requiring less costs and efforts comparing with similar methods of MCDA, the choice of AHP approach in this work made it possible to find the optimal sequence implementation of digital technologies at logistics operator. Thanks to this sequence, the enterprise has the opportunity to decrease not only financial risks, but also risks associated with technical difficulties of the simultaneous launch of digital technologies. Therefore, it is recommended to introduce the RFID system first. Then, the electronic document management should be launched. After that, it is recommended to introduce a scale scanner. Finally, the GPS system should be applied.

Thus, the results of this study can help many enterprises, in particular in the field of logistics, to more accurately assess the possibilities of digitalization of certain aspects of their activities. In particular, using the recommended algorithm for modeling the digitalization process and good visibility of key changes that may occur at the investigated logistics operator resulting from digitalization tools set implementation, will allow domestic logistics operators to make optimal decisions.

Prospects for future research

The prospects for the future research lie in the development and further deepening of knowledge about the applied aspects of improving the competitiveness of logistics operators based on the digitalization potential of logistics services.

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ПОТЕНЦІАЛ ДІДЖИТАЛІЗАЦІЇ ЛОГІСТИЧНОГО ОПЕРАТОРА

Досліджено методологічні аспекти управління процесом логістичного обслуговування клієнтів підприємств під кутом удосконалення потенціалу його диджиталізації. Встановлено, що потенціал оцифрування логістичних процесів знаходить вияв, насамперед, у підвищенні швидкості та ефективності управління, можливості своєчасного коригування загроз і ризиків, які виникають, та у полегшенні аналітичного опрацювання та точнішого оцінювання великих масивів інформації. З метою виявлення потенціалу диджиталізації процесу логістичного обслуговування підприємства на прикладі діяльності логістичного оператора, що здійснює доставку вантажів на території України, змодельовано ключові зміни, які можуть виникнути на підприємстві на основі імплементації комплексу заходів щодо упровадження засобів диджиталізації.

Ключові слова: диджитал-технології; логістичне обслуговування; АНР-аналіз; RFID система; GPS система.