Список использованных источников

1. Bulanova E. V., Somenkova N.S., Jagunova N.A. Formirovanie strategii razvitija malogo innovacionnogo predprijatija promyshlennogo kompleksa // Voprosy innovacionnoj jekonomiki. 2019. Tom 9. № 2. s. 449-466. doi: 10.18334/vinec.9.2.40783.

2. Efimova I.F., Tokarev R.S. Upravlenie innovacionnoj dejatel'nost'ju predprijatija na osnove logisticheskogo podhoda [Jelektronnyj resurs] // Jekonominfo. – 2018// Available at : https://cyberleninka.ru/article/n/upravlenie-innovatsionnoy-dejatelnostju-predprijatija-na-osnove-logisticheskogo-podhoda (accessed: 14.04.2020).

3. Karpova N.P. Logistika kak upravlencheskaja innovacija v rynochnom prostranstve // Jekon. nauki. 2011. № 4 (77). S. 71-75

4. Karpova N.P., Noskov S.V., Tojmenceva I.A., Chichkina V.D., Shvecova E.V. Osnovy prinjatija strategicheskih reshenij v logistike: monografija. – OOO Izdatel'stvo «KUBiK», 2018. 138s.

5. Kleshheva O.A., Sajfullina F.M. Prognozirovanie sprosa na innovacionnyj produkt s uchetom vlijanija makrojekonomicheskih faktorov // Voprosy innovacionnoj jekonomiki. 2019. Tom 9. № 3. s. 945-954. doi: 10.18334/vinec.9.3.41011.

6. Matrizaev B.D. Formirovanie novoj modeli innovacionnogo rosta ili «nevidimaja» logika sovremennogo innovacionnogo imperativa // Voprosy innovacionnoj jekonomiki. 2019. Tom 9. № 1. s. 111-136. doi: 10.18334/vinec.9.1.40500.

7. Tendencii i innovacii logistiki Available at: http://supplychains.ru/2015/04/21/iinovation-v-logisitike-cityehpress/ (accessed: 21.04.2020).

УДК 658.7

ПЕРСПЕКТИВЫ РАЗВИТИЯ РАДИОЧАСТОТНОЙ ИДЕНТИФИКАЦИИ В СФЕРЕ ЛОГИСТИКИ В РЕСПУБЛИКЕ БЕЛАРУСЬ

Кочурко О.А

Брестский государственный технический университет
Республика Беларусь, г. Брест, ул. Московская, 267.

В мировой практике управления логистическими процессами установлено, что оперативная и достоверная информация о товарно-материальном потоке позволяет обеспечить эффективную и рентабельную логистику. С этой целью в настоящее время проводится активное исследование и внедрение технологии радиочастотной идентификации в процессы управления цепями поставок, которая позволит существенно снизить временные и финансовые затраты.

Ключевые слова: система электронной идентификации, технология RFID, логистические процессы, цепи поставок, RFID-метки

PROSPECTS FOR THE DEVELOPMENT OF RADIO FREQUENCY IDENTIFICATION IN THE FIELD OF LOGISTICS IN THE REPUBLIC OF BELARUS

Kachurka V.A

Brest State Technical University
Republic of Belarus, Brest, str. Moscowskaya, 267.

In the world practice of managing logistics processes, it has been established that prompt and reliable information about the flow of goods and materials allows for efficient and cost-effective

logistics. To this end, active research and implementation of radio frequency identification technology in supply chain management processes is currently underway, which will significantly reduce time and financial costs.

Keywords: electronic identification system, RFID technology, logistics processes, supply chains, RFID tags

Since the last quarter of the XX century the world economy is undergoing significant changes due to the rapid development of information, communication and transport technologies, as well as in connection with the liberalization of international trade. One of the key changes was the widespread use of IT technologies. The emergence of free access to the Internet has carried out a real "digital" revolution, which has changed both our lives in general and the economy.

The availability, efficiency and cost-effectiveness of the implementation of logistics processes is due to reliable and relevant information about the commodity and material flow. With the development of the digital economy, the number of IT technology tools is also growing, most of which are already involved in optimizing the processes of the logistics sector. One such digitalization tool is radio frequency identification technology or RFID (Radio Frequency IDentification). Based on modern cargo identification and tracking capabilities, RFID technology can significantly speed up the life cycle of a cargo, minimizing human intervention.

The main essence of radio frequency identification technology is to store information and extract data using radio frequency waves, that is, with the help of RFID, goods or cargo in the warehouse are automatically accounted for, as well as tracking the objects in question at all stages of the supply chain, without the influence of the human factor. In this case, various format systems and RFID tag standards are used .

RFID technology includes three main components: a computer system for data processing, a transponder (tag) and a reader.

Transponders are devices for collecting, storing and transmitting data. Their structure is based on an integrated circuit for communication with the reader and an antenna. Readers convert information from transponders into digital data for subsequent processing and transmission to the accounting system. However, it is important to note that after establishing reliable information relationships, ensuring a constant flow of information becomes a mandatory step.

Radio frequency identification RFID is rightfully considered one of the most important elements of complex automation at the ERP standard level and above. Any process of an economic entity that requires high-quality, operational control, as well as fast tracking, registration of the objects in question and their accounting in the present time, requires the use of RFID systems. Processing timely received data helps to give an accurate assessment of the planned level of production and logistics resources, as well as monitor the implementation of developed tasks and plans.

Radio frequency information technology has a number of advantages, among which the following can be noted: the ability to store more data compared to a barcode; high reading speed and reliability; contactless reading of information at a distance; reliable protection against counterfeiting; ability to rewrite data; ability to read multiple tags; convenient dimensions; unlimited period of use of the technology; ease of use and maintenance; strength; independence from storage conditions.

The development and implementation of RFID technologies in the Republic of Belarus is carried out by the Center for Identification Systems. The results of their activities are used in industry, transport and warehouse logistics, access control and management systems, medicine, libraries, remote control and other spheres of life [1].

An important feature of the use of RFID systems is the continuity between industrial and logistics services. This involves the use of tags attached during the manufacturing process during the warehousing stages to verify the authenticity of an item once in use. Also in industry, RFID tags can provide the operator with the ability to control equipment in the required location using a special interface.

In the field of road transport, the electronic identification system is used in public transport, as well as in special vehicles as a pass at traffic lights. For example, in the Republic of Belarus, a single travel ticket developed for the Municipal Transport Unitary Enterprise Minsktrans has been created and is actively used. Also in active use are fuel cards to automate payment and refueling at automobile gas stations (gas stations) of the Republic of Belarus.

To increase the safety and comfort of patient treatment, RFID technologies are also used in medicine. An example of such an innovation is the use of an "electronic prescription", that is, a plastic card for more optimized medical care.

One of the most significant processes is the automated "control of the legality of goods" system. It is designed to control the movement of goods from the starting point to the final point. Members of the Eurasian Economic Union signed an agreement on the implementation of a project to mark certain groups of goods with control identification marks, and a red or green flexible strip containing an RFID tag was chosen as a control identification mark (CIS). This system provides information to the user about the legality or illegality of the presence of goods in circulation. The system was created for use by both legal entities and individual entrepreneurs who produce, transport and trade goods that require marking with identification marks. The list of such goods is established by the legislation of the Republic of Belarus.

To be able to use tags, they must be initialized, that is, parameters must be defined and prepared for use. First, the product is assigned a global identification number, after which the tag is purchased and information is entered into the Bank, which contains electronic passports of the goods. Next, the initialization itself occurs - that is, recording through the Identification Systems Center program into the tag's memory. After this, you can label the product.

Since 2005, a number of pilot projects for various fields have been implemented in Belarus based on RFID technologies. The efficiency of automation and ensuring the reliability of business processes in supply chains can ensure the transition to radio frequency identification technologies. For consumers, this is a guarantee of the safety of the products they consume, as well as a way to prevent the market from being filled with low-quality and counterfeit products. In the near future, it is planned not only to modernize the RFID tag system, but also to enter the received information into the interdepartmental distributed information database "Electronic Passport Data Bank". The introduction of this technology is necessary for the "visible" movement of goods at the cross-border level using Internet technologies. As a result, each individual will have the opportunity to control the legality of each unit of purchased goods at any point in the supply chain through access to the Bank of Product Passports via the Internet [2].

Another project is a monitoring system for strict reporting forms of the Department of State Signs of the Ministry of Finance of the Republic of Belarus. With its help, there is an automatic control over the movement of strict reporting forms, using RFID technology tags . The main advantage of this system is the absence of human intervention, which in turn increases the level of information reliability.

An automated information system for accounting for library collections was also developed based on radio frequency identification technologies. It made it possible to automate all the main processes of the library, such as accounting and control of readers and storage units. This system has been used in the Central Scientific Library of the Republic of Belarus since 2011 [3].

The Center for Identification Systems developed and implemented a comprehensive RFID system for higher education institutions. In 2010, this made it possible to obtain a new student card. It is an important document for security check system, library system and more. The advantage of this system is integration with existing university systems at minimal cost.

The Center for Identification Systems also contributed to the creation of the logistics server of the Logistic Spy enterprise. The system allows you to keep records of logistics operations using RFID technology during transportation, production, warehouses, and so on. With this server, logistics methods such as "Just in time", "Tracking", external and internal logistics can be improved.

RFID technology has a significant number of opportunities for the rational functioning of logistics processes, including reducing the costs of controlling cargo flows and more efficiently managing business processes in the supply chain.

As noted earlier, to achieve effective functioning of RFID technology, it is necessary to ensure a constant and reliable flow of data. The process of information transfer within the supply chain is schematically presented in Figure 1.

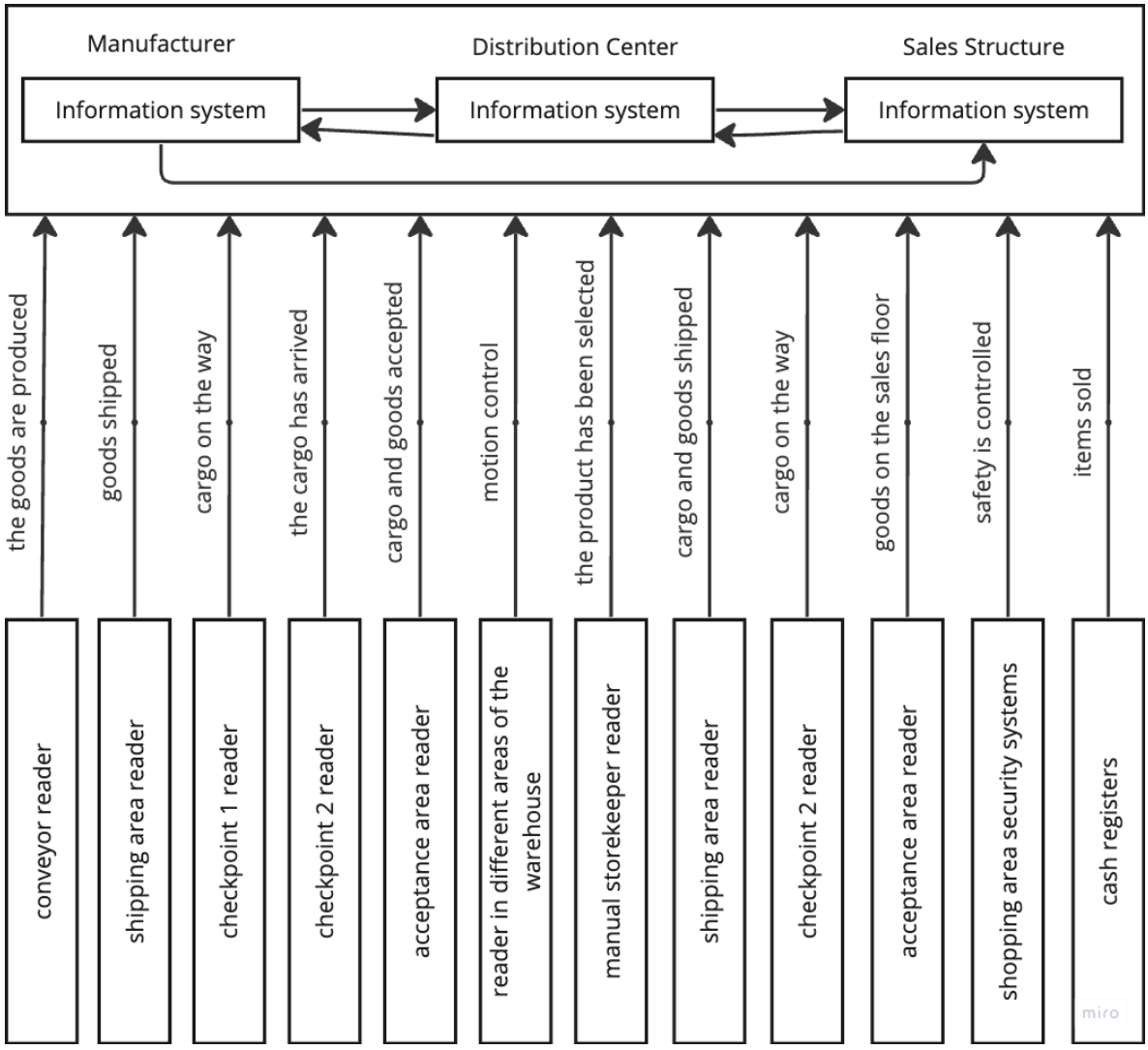

Fig. 1 – Scheme of interaction between enterprises within the supply chain using RFID

Thus, the use of RFID tags allows you to track the cargo at every stage of its life cycle. All equipment and personnel involved in the process of goods circulation are also under RFID control. As a result, automated information is placed in the public domain, including for external users, which allows each participant in the distribution process to influence the management decision.

In conclusion, it can be noted that the introduction of RFID technology in logistics will help reduce costs by improving the production method. It provides the best traceability – that is, the greatest potential for improvement, and therefore the greatest cost savings. RFID technology has several advantages over barcoding:

- reading tags without human intervention, and, as a result, reducing errors and eliminating delays;
- adding and changing data in the tag's memory and having an electronic passport that cannot be lost;
- the presence of group operations that reduce processing time;

- providing information about business events in real time, which leads to faster decision-making, and then to the implementation of JIT principles.

RFID technology in logistics helps track automatic data updates in real time. Due to process efficiency, less warehouse space is occupied, resulting in lower storage costs.

References

1. National Center for Electronic Services [Electronic resource]. Brest, 2023. Mode of access: https://nces.by. Date of access: 30.08.2023.

2. Official website of the Ministry of Communications and Information of the Republic of Belarus [Electronic resource]. Brest, 2023. Available at : https://www.mpt.gov.by. Date of access: 05.09.2023.

3. Official website of the State Committee on Science and Technology [Electronic resource]. Brest, 2023. Mode of access: http://www.gknt.gov.by/. Date of access: 10.09.2023.

4. Logistics Club Available at: http://www.logists.ru. Date of access: 06.09.2023.

УДК 334.021

ПРИМЕНЕНИЕ МЕХАНИЗМА ГРЕЙДИРОВАНИЯ ДЛЯ АНАЛИЗА ЛОГИСТИЧЕСКИХ ПРЕИМУЩЕСТВ РЕГИОНОВ

С.Ф. Куган
Белорусский государственный экономический университет
Республика Беларусь, г. Минск, Партизанский пр-т, 26
sfkugan@mail.ru

Наличие у региона определенных преимуществ позволяет ему быть конкурентоспособным и более эффективно развиваться. Логистические преимущества определяют возможности региона в сфере логистики и могут быть использованы при принятии управленческих решений, делая их более эффективными. Предлагаемый в статье механизм грейдирования позволяет выявить существующие логистические преимущества регионов Республики Беларусь и использовать эти знания для построения программ стратегического развития.

Ключевые слова: логистические преимущества региона, механизм грейдирования, оценка рисков.

APPLICATION OF THE GRADING MECHANISM FOR THE ANALYSIS OF THE LOGISTIC ADVANTAGES OF THE REGIONS

S. F. Kugan

Belarusian State Economic University
Republic of Belarus, Minsk, Partizansky avenue, 26
sfkugan@mail.ru

The presence of certain advantages in the region allows it to be competitive and develop more efficiently. Logistical advantages determine the possibilities of the region in the field of logistics and can be used in making management decisions, making them more efficient. The grading mechanism proposed in the article makes it possible to identify the existing logistical advantages of the regions of the Republic of Belarus and use this knowledge to build strategic development programs.

Key words: logistical advantages of the region, grading mechanism, risk assessment.