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The effectiveness of the implemented inventory management method - case study of a manufacturing company

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Abstract
One of the basic factors influencing the functioning of production enterprises is the correct inventory management. There are many methods that have been analysed and improved in recent years, but they often differ from company practices. In addition, technological development that allows for production support forces enterprises to take specific actions in the area of warehouses and inventory management. The article presents considerations on selected aspects of inventory management and analyses this element in a selected company. An analysis of the purchases of strategic raw materials in the last months in connection with the invasion of Ukraine and the reduced availability of production materials was also presented.

Keywords: Inventory management; warehouse; logistics; FIFO; LIFO

1. INTRODUCTION

Inventory management in modern enterprises is one of the challenges faced by managers in a given area. Enterprises that use non-renewable resources in their processes are increasingly looking for alternatives, which is not always possible. In addition,

the current situation in Ukraine and the sanctions imposed on Russia have a direct impact on the activities of many enterprises. For the first 3 weeks, many companies were not able to obtain new supplies of raw materials, and when they appeared on the market, their price often increased by several dozen percent in relation to the prices at the level before the outbreak of the war. Currently - more than 2 months after the invasion - the availability of materials has improved, while their prices remain very high. Thanks to the efforts of employees from the purchasing department, many companies have material security that will ensure production continuity for several weeks. Despite the relative stabilization of the situation abroad, it is difficult to say with certainty that enterprises are no longer threatened by a complete shortage of materials, but their availability on world markets seems to be stabilizing.

The purpose of this article is to analyse inventory management in a selected manufacturing enterprise, as well as to present the impact of recent political developments on inventory management. The article presents topics related to the methods of inventory management in manufacturing companies, as well as inventory management solutions that can be used in the analysed enterprise.

2. INVENTORY MANAGEMENT METHODS

Characterization of the methods of inventory management in an enterprise should be started first of all with explaining the concept of resources, which are a superior concept over inventory. In the PWN Dictionary of the Polish Language, resources are defined as "a certain amount of something, accumulated for the future use" and as "experience, knowledge or skills"[1]. On the other hand, the Dictionary of the Polish Language edited by W. Doroszewski additionally indicates the synonyms of resources, such as "stock" or "reserve"[2]. Resources are also defined as all materials and intangible production processes that are necessary for the production of goods[3]. However, the structure of resources in literature is presented in a different way - depending on the method of resource interpretation, context and research perspective. One of the most common is the division into four groups: financial, physical, human and organizational capital[4]. In another approach, resources are divided into tangible (i.e.

1 https://sjp.pwn.pl/szukaj/zasoby.html [Access on 10.04.2022]

2 https://sjp.pwn.pl/doroszewski/zasob;5527208.html [Access on 10.04.2022]

3 Beksiak J., *Ekonomia*, Wydawnictwo PWN, Warszawa 2001, p. 112.

4 Barney J. B., *Gaining and Sustaining Competitive Advantage*, Addison-Wesley Publishing Company Inc., New York 1997, p. 143.

inventories, company assets, finances) and intangible (i.e. relationships, competences, attitudes)[5] – fig. 1.

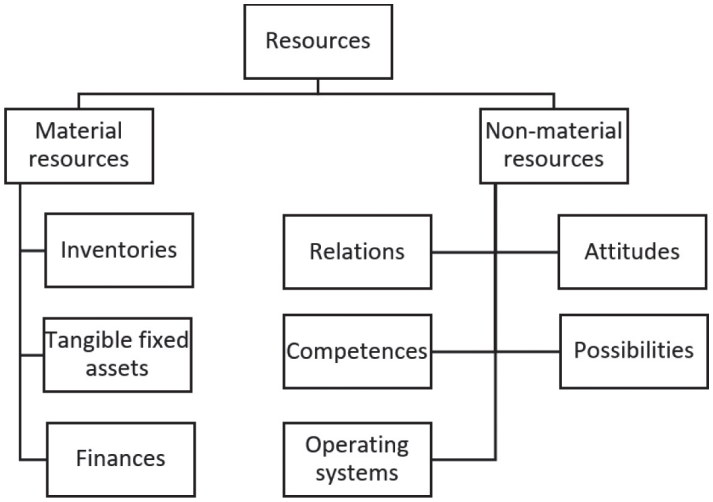

Fig. 1. Enterprise resource classification

The activity of virtually every enterprise is related to inventory logistics. The creation and maintenance of inventories is an element having a strategic impact on the production activity of the enterprise. Each, even a minor, disruption in the supply chain may affect the stability of the production process, and this, in turn, will have an impact on the company's logistics system (fig. 2).

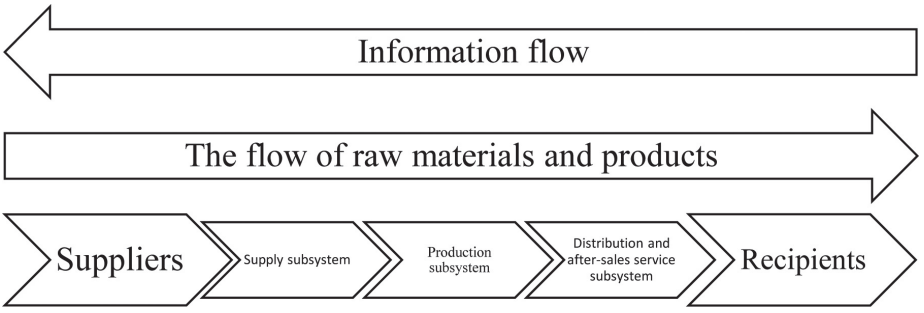

Fig. 2. Logistics system of a production company

[5] Sopińska A., *Kapitał intelektualny w zarządzaniu od teorii do praktyki - wizja przyszłości*, "Studia i Prace Kolegium Zarządzania i Finansów. Szkoła Główna Handlowa", 76 (2007), pp. 139-152.

Inventories in an enterprise include not only the generally understood semi-finished products or raw materials used in the production process, but also goods purchased and intended for resale, e.g. goods purchased by a retail trade unit for resale, or land and other real estate intended for resale (Fig. 3). Inventories also include finished goods that are produced, or are in the process of being manufactured by an enterprise.

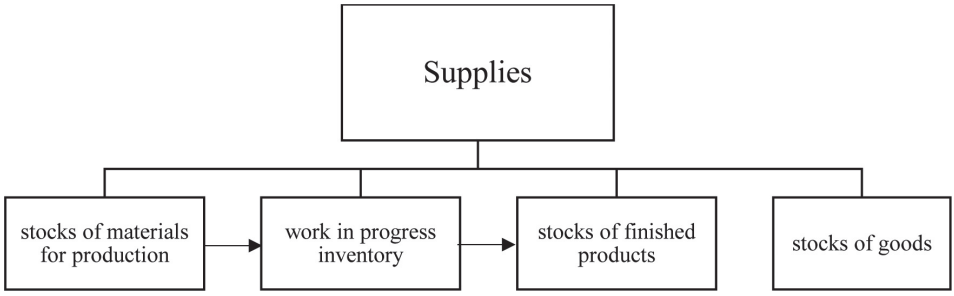

Fig. 3. Inventory classification

The state of inventories and their proper management in the enterprise plays a fundamental role in the entire production process. Contemporary literature distinguishes several types of inventory flow in enterprises. The most commonly used techniques for storing goods are: FIFO, LIFO and FEFO.

The FIFO method applies to the valuation of the consumption of materials for production, it is based on the assumption that the release of materials for production takes place according to the chronology of their admission to the warehouse. This is the First In - First Out principle, according to which the goods that have been stored for the longest period of time are released for production in the first place. This principle also assumes a constant and continuous flow of materials[6].

The LIFO method is the opposite of the FIFO method. It is a method of valuating the consumption of raw materials based on the assumption that their release for production is based on the purchase price of materials that were last entered into the warehouse. It is the principle of Last In - First Out, according to which goods

[6] Fertsch M. (red.), *Słownik terminologii logistycznej*, Instytut Logistyki i Magazynowania, Poznań 2016, p. 16.

stored for the shortest period of time in the warehouse are released for production in the first place. It is used the least frequently due to the disorganization it introduces in warehouse management[7].

The last most commonly used method of inventory management is FEFO, which due to its nature is used primarily in food production companies, but not only. They can also be, for example, chemicals or pharmaceuticals. This is the principle of First Expired - First Out, according to which the earliest goods that expire are first issued[8].

It is also worth mentioning that among the methods of inventory management we distinguish: the HIFO principle (Highest In - First Out - the most expensive in, first out) and the LOFO principle (Lowest In - First Out - the cheapest in, first out), which, however, due to a very narrow specialization are used marginally.

There are also the latest methods of inventory management, such as AI systems, loTs or RFID, which allow the use of information systems. One of the most frequently used is the RFID system, which has been widely used in warehouse management (but not only). With inventory management in mind, the RFID system is about placing Tags on vehicles, objects, and items. This allows you to monitor their location and facilitates the management of the flow of goods. Remote reading of information about goods speeds up loading and unloading processes. In addition, verification of the stored assortment in warehouses or order picking is also much faster. By using RFID tags and antennas located near the exits (so-called gates), warehouse employees are able to accurately control the amount and type of goods issued. The RFID system, in addition to supporting inventory management, is also used, inter alia, in work time measurement, access control (e.g. to offices) or even in libraries[9][10].

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7 Fertsch M. (red.), *Słownik terminologii logistycznej*… op. cit., p. 54.

8 Loc. cit.

9 Gładysz B. , Grabia M., Santarek K.: *RFID od koncepcji do wdrożenia. Polska perspektywa*, Wydawnictwo Naukowe PWN, Warszawa 2017, p. 23

10 Kraśnicka T., Gładysz B., Kucińska-Landwójtowicz A.: *Doskonalenie organizacji i procesów innowacyjnych*, PWE Polskie Wydawnictwo Ekonomiczne, Warszawa 2020, p. 12

3. THE IMPACT OF THE COMPETITIVENESS OF OFFERS ON INVENTORY MANAGEMENT

Competition is an essential feature of the economy. The lack of competition in the market creates a monopoly, and this leads to the use of the law of supply and demand to artificially raise prices. For manufacturing companies, the lack of more than one supplier means complete compliance with the imposed price or quantity of the purchased goods. On the other hand, for enterprises offering their products, the proper definition of the area of competitiveness allows for the definition of products and services that they intend to produce and offer to customers, while taking into account the structure and intensity of competition and the existing cooperative relationships. In this respect, the company's knowledge of the market allows it to strengthen its competitiveness against rivals and other market entities, as well as the competitiveness of entire supply chains[11]. Table 1 presents selected definitions of competitiveness.

Author	Definition of Competitiveness
E. Cyrson	A process in which market participants, striving to pursue their interests, try to present an offer that is more favourable than their competitors in terms of price, quality or other features influencing customer purchasing decisions.
S. Flejterski	The company's ability to design, manufacture and sell products whose prices, quality and other values are more attractive to customers compared to the analogous attributes of products offered by competitors.
Ch. Hampden-Turner, A. Trompenaars	Competition and cooperation between companies leading to the recognition of both essential technologies and the needs and requirements of customers.
E. Jantoń-Drozdowska	The ability of the enterprise to increase the efficiency of internal functioning by strengthening and improving its market position.
E. Urbanowska-Sojkin	The company's ability to function effectively and develop under the conditions of a given competition

The concept and the essence of shaping a competitive advantage have been analysed since the 1980s. However, building and maintaining a competitive advantage of enterprises depends on both internal and external factors. Classic concepts of

[11] Matwiejczuk R., *Koncepcja dynamicznych zdolności w budowaniu konkurencyjności łańcucha dostaw*, "Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach", 381 (2019), pp. 18-30.

building the competitiveness of enterprises took into account, first of all, internal factors, such as production costs, product quality, marketing and the company's position on the market. One of the most famous concepts in the literature is the classic concept of the competitive advantage base by M.E. Porter. Its basis is the search for a competitive advantage in the sector of the economy in which a given enterprise operates. However, the dynamically changing market situation today, involving also information systems and constantly developing technology, has shown how insufficient are the classic concepts of enterprise competitiveness in seeking new opportunities to build a competitive advantage of an organization on the market. However, in all theories dealing with the competitiveness of enterprises, the main role is played by competitive advantage[12].

Achieving and maintaining a competitive advantage is possible, among others, thanks to human resources that determine the implementation of innovative processes in enterprises. Therefore, knowledge is considered to be one of the most important sources of competitive advantage of modern enterprises. Modern managers must not only be able to manage resources, but also analyse available data and predict future actions[13]. They must have a flexible approach that will allow for the modification and often adaptation of existing inventory management methods to a specific situation in the company. Such action often requires not only knowledge, but also intuition and confidence in action[14].

4. CASE STUDY

In the analysed manufacturing company, it was decided to look at both the methods of inventory management and the impact of competitiveness on the level of inventories. An ERP system is used for production reporting in the enterprise, which - depending on the department of the enterprise - allows for various actions related to information management. In the surveyed company, the Warehouse is responsible for inventory and receipt of raw materials. In the warehouse, the goods

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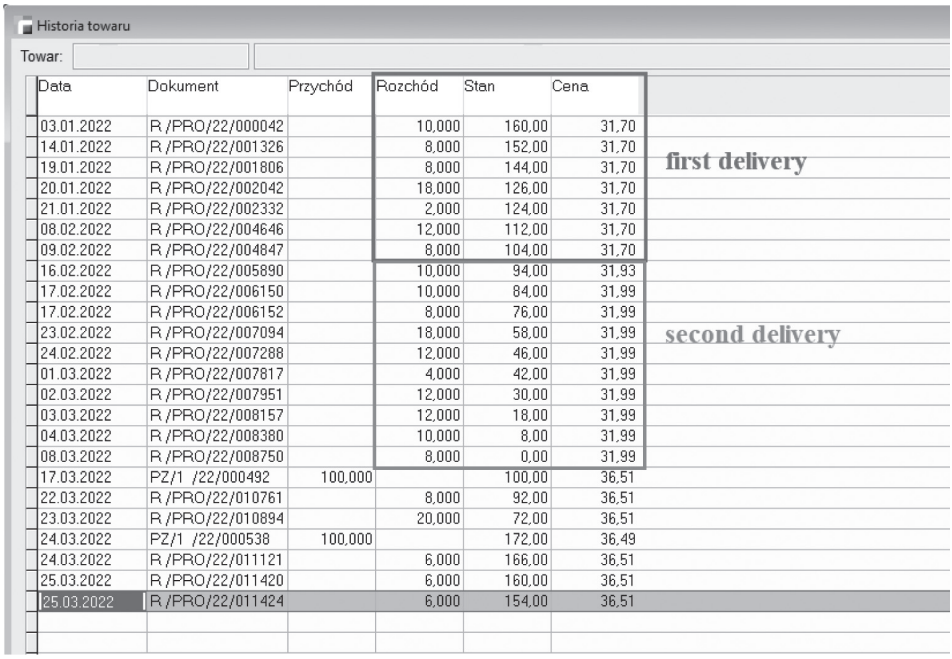
12 Matwiejczuk R., *Koncepcja dynamicznych zdolności…,* loc. cit.; Matwiejczuk R., *Kompetencje logistyki w tworzeniu przewagi konkurencyjnej przedsiębiorstwa*, Wydawnictwo Uniwersytetu Opolskiego, Opole 2014, pp. 355-364.

13 Staniewski M., *Zarządzanie wiedzą w przedsiębiorstwach – przegląd badań*, [in:] Dąbrowski J., Gierszewska G. (red.), *Strategie przedsiębiorstw a zarządzanie wiedzą*, Wydawnictwo WSPiZ im. Leona Koźmińskiego, Warszawa 2005, s. 19.

14 Mikuła B., *Geneza, przesłanki i istota zarządzania wiedzą*, [in:] Perechuda K. (red.), *Zarządzanie wiedzą w organizacji*, Wydawnictwo PWN, Warszawa 2005, pp. 11-23.

are subject to quantitative control and reported to the system. The ERP system works in accordance with the FIFO principle - first in, first out, which is best illustrated during the analysis of the outflow of materials for production with a simultaneous price change with subsequent deliveries (Fig. 4).

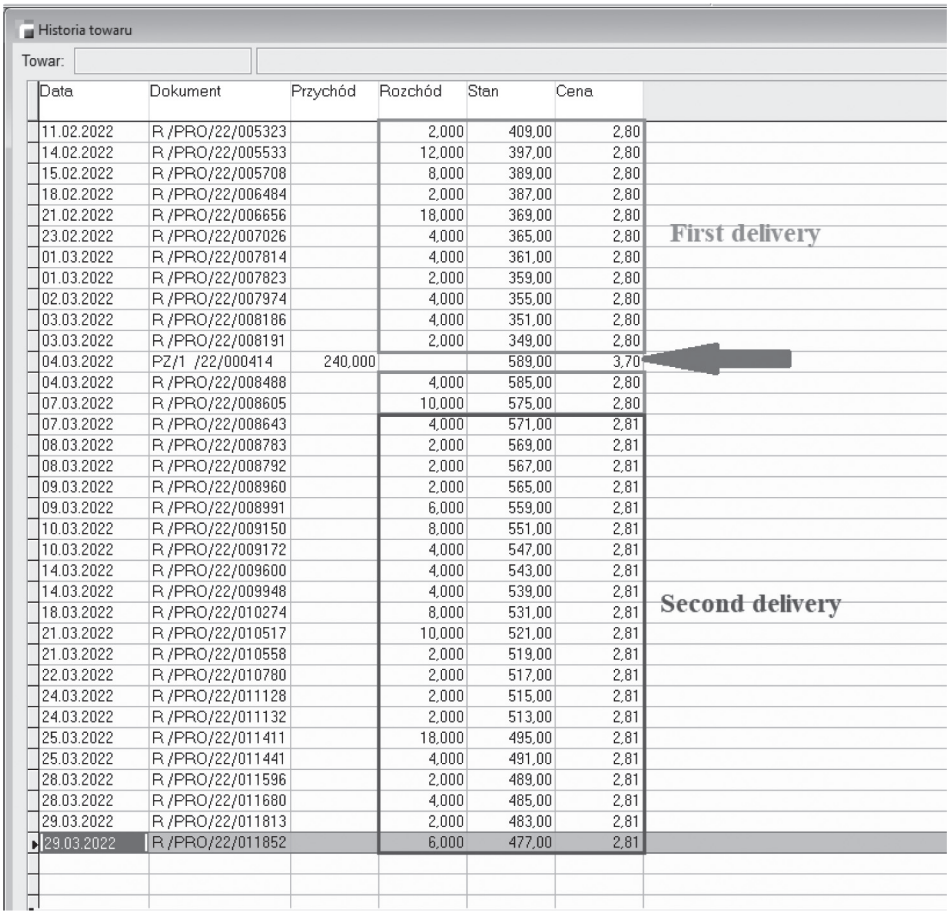

Historia towaru

Towar:

Data	Dokument	Przychód	Rozchód	Stan	Cena	
03.01.2022	R /PRO/22/000042		10,000	160,00	31,70	
14.01.2022	R /PRO/22/001326		8,000	152,00	31,70	
19.01.2022	R /PRO/22/001806		8,000	144,00	31,70	first delivery
20.01.2022	R /PRO/22/002042		18,000	126,00	31,70	
21.01.2022	R /PRO/22/002332		2,000	124,00	31,70	
08.02.2022	R /PRO/22/004646		12,000	112,00	31,70	
09.02.2022	R /PRO/22/004847		8,000	104,00	31,70	
16.02.2022	R /PRO/22/005890		10,000	94,00	31,93	
17.02.2022	R /PRO/22/006150		10,000	84,00	31,99	
17.02.2022	R /PRO/22/006152		8,000	76,00	31,99	
23.02.2022	R /PRO/22/007094		18,000	58,00	31,99	second delivery
24.02.2022	R /PRO/22/007288		12,000	46,00	31,99	
01.03.2022	R /PRO/22/007817		4,000	42,00	31,99	
02.03.2022	R /PRO/22/007951		12,000	30,00	31,99	
03.03.2022	R /PRO/22/008157		12,000	18,00	31,99	
04.03.2022	R /PRO/22/008380		10,000	8,00	31,99	
08.03.2022	R /PRO/22/008750		8,000	0,00	31,99	
17.03.2022	PZ/1 /22/000492	100,000		100,00	36,51	
22.03.2022	R /PRO/22/010761		8,000	92,00	36,51	
23.03.2022	R /PRO/22/010894		20,000	72,00	36,51	
24.03.2022	PZ/1 /22/000538	100,000		172,00	36,49	
24.03.2022	R /PRO/22/011121		6,000	166,00	36,51	
25.03.2022	R /PRO/22/011420		6,000	160,00	36,51	
25.03.2022	R /PRO/22/011424		6,000	154,00	36,51	

Fig. 4. An example of a price change during goods issue in the ERP system
Source: company data

Fig. 4 shows the price changes during the analysed month, after which the disbursement is made in the system. This, in turn, also affects the final price of the product. In this case, it is important that the stock quantity was 0, and from 17/03/2022 the goods were consumed at the new price for production issues. However, this is not always possible. The next figure (Fig. 5) shows a situation in which the price of a commodity used for production differs significantly from the price from its last delivery.



Historia towaru

Towar:

Data	Dokument	Przychód	Rozchód	Stan	Cena
11.02.2022	R /PRO/22/005323		2,000	409,00	2,80
14.02.2022	R /PRO/22/005533		12,000	397,00	2,80
15.02.2022	R /PRO/22/005708		8,000	389,00	2,80
18.02.2022	R /PRO/22/006484		2,000	387,00	2,80
21.02.2022	R /PRO/22/006656		18,000	369,00	2,80
23.02.2022	R /PRO/22/007026		4,000	365,00	2,80
01.03.2022	R /PRO/22/007814		4,000	361,00	2,80
01.03.2022	R /PRO/22/007823		2,000	359,00	2,80
02.03.2022	R /PRO/22/007974		4,000	355,00	2,80
03.03.2022	R /PRO/22/008186		4,000	351,00	2,80
03.03.2022	R /PRO/22/008191		2,000	349,00	2,80
04.03.2022	PZ/1 /22/000414	240,000		589,00	3,70
04.03.2022	R /PRO/22/008488		4,000	585,00	2,80
07.03.2022	R /PRO/22/008605		10,000	575,00	2,80
07.03.2022	R /PRO/22/008643		4,000	571,00	2,81
08.03.2022	R /PRO/22/008783		2,000	569,00	2,81
08.03.2022	R /PRO/22/008792		2,000	567,00	2,81
09.03.2022	R /PRO/22/008960		2,000	565,00	2,81
09.03.2022	R /PRO/22/008991		6,000	559,00	2,81
10.03.2022	R /PRO/22/009150		8,000	551,00	2,81
10.03.2022	R /PRO/22/009172		4,000	547,00	2,81
14.03.2022	R /PRO/22/009600		4,000	543,00	2,81
14.03.2022	R /PRO/22/009948		4,000	539,00	2,81
18.03.2022	R /PRO/22/010274		8,000	531,00	2,81
21.03.2022	R /PRO/22/010517		10,000	521,00	2,81
21.03.2022	R /PRO/22/010558		2,000	519,00	2,81
22.03.2022	R /PRO/22/010780		2,000	517,00	2,81
24.03.2022	R /PRO/22/011128		2,000	515,00	2,81
24.03.2022	R /PRO/22/011132		2,000	513,00	2,81
25.03.2022	R /PRO/22/011411		18,000	495,00	2,81
25.03.2022	R /PRO/22/011441		4,000	491,00	2,81
28.03.2022	R /PRO/22/011596		2,000	489,00	2,81
28.03.2022	R /PRO/22/011680		4,000	485,00	2,81
29.03.2022	R /PRO/22/011813		2,000	483,00	2,81
29.03.2022	R /PRO/22/011852		6,000	477,00	2,81

Fig. 5. Issue of goods at a price different from the last delivery

Source: company data

In this situation, there is a clear difference between the commodity that is systematically put into production and the price from the last delivery. In the analysed situation, with the current consumption of material, the company will probably start to systematically spend goods from the delivery on 04/03/2022 only in the first half of May. However, in practice, in the analysed enterprise, the physical expenditure of raw materials is in line with the LIFO principle - last in, first out. This is mainly due to the quantity of raw materials ordered and the availability of them in the warehouse. For production workers, the most accessible raw materials are located on the 0 or 1 level of the warehouse rack (Fig. 6).

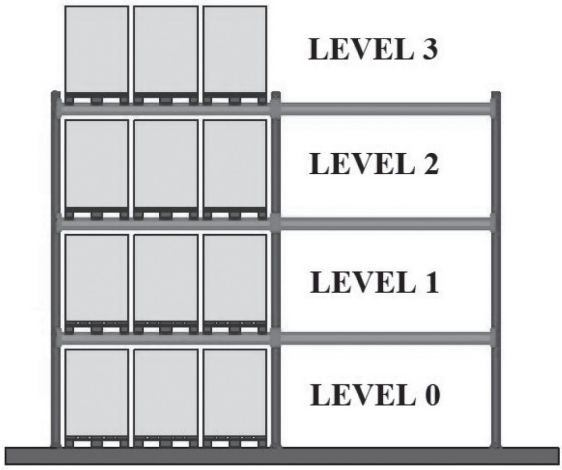


Fig. 6. Scheme of racks in a warehouse in the analysed enterprise
Source: own study

Therefore, in the analysed situation, the last goods accepted into the warehouse will be at the lowest level of the rack, and therefore will be taken for production in the first place. By doing this, the FIFO principle, which in the ERP system shows the consumption of raw materials, turns into the LIFO principle that works in reality. Therefore, it is necessary to consider what actions must be taken for the FIFO principle to also work in practice. One of the proposed solutions may be the reorganization of the method of placing raw materials on shelves. It should be done in such a way that the goods that were accepted first are on the lowest or maximum on the first level of the rack (fig. 7). Therefore, the commodity should be pulled from higher to lower levels on an ongoing basis, so that its physical issuing is consistent with the issuing in the ERP system.

The proposed solution to the current problem related to the logistics of raw material collection for production is now a solution that will not generate additional costs for the company. It is not the only solution that could be introduced to inventory management in the analysed case. There are IT management systems mentioned in the theoretical part, such as RFID. However, due to the fact that in the analysed company the number of raw materials that need to be stored on racks is relatively small (about 150 items that are stored not only in the main warehouse, but also in cabinets at production stations or in the warehouses of individual nests). and the

implementation of such a solution in the analysed enterprise would be unprofitable from the point of view of the costs that it would have to incur.

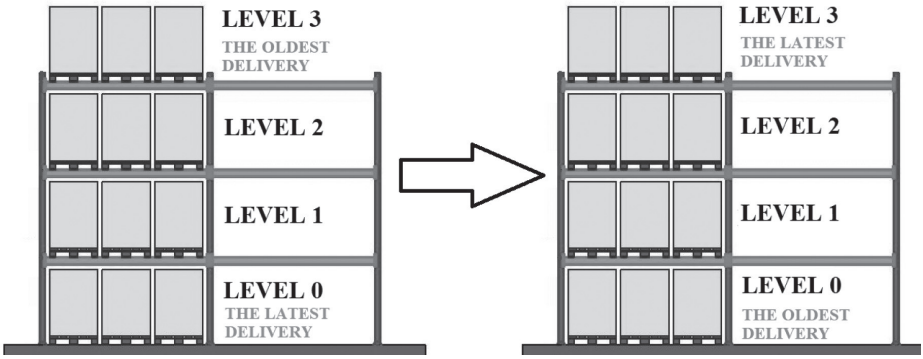


Fig. 7. A proposal to reorganize the way of placing goods on racks in a warehouse
Source: own study based on data from the enterprise

By analysing the data obtained from the surveyed enterprise, one can notice the influence of the current political situation on the level of inventories. Due to strategic raw materials, the supplies of which were threatened by the conflict in Ukraine, purchasing specialists tried to take full advantage of the company's warehouse capacity by ordering goods well in advance and in increased quantities. It was observed in the case of 3 strategic raw materials (Figs. 8, 9 and 10).

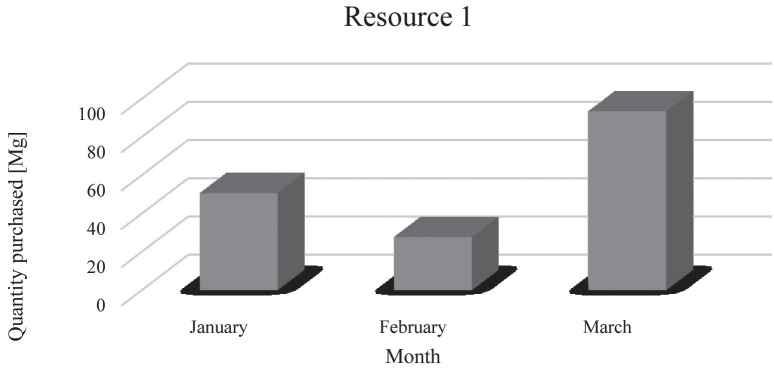


Fig. 8. Orders for raw material 1 in the first three months of 2022
Source: own study based on data from the enterprise

Previous purchases of raw material 1 remained at the level of approximately 50 Mg per month, except in February 2022, when the demand for raw material was less than 28 Mg. Due to the concern about the instability of supplies in March, the purchased quantity was increased to over 93Mg, which means that the purchase of this raw material almost doubled in relation to the previous months.

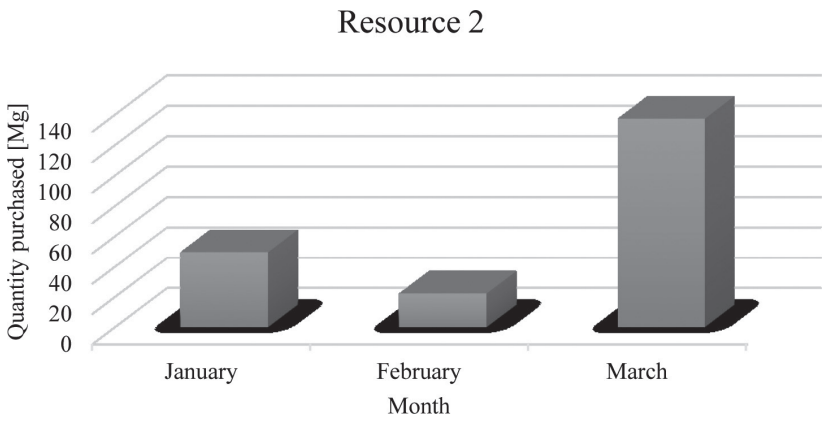


Fig. 9. Orders for raw material 2 in the first quarter of 2022
Source: own study based on data from the enterprise

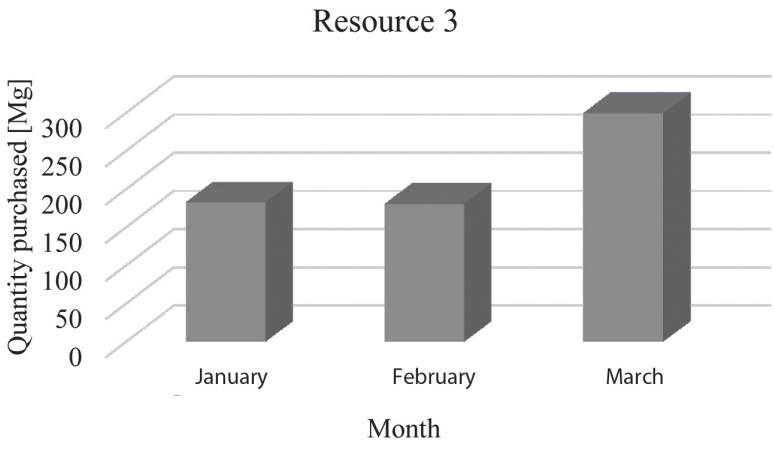


Fig. 10. Orders for raw material 3 in the first three months of 2022
Source: own study based on data from the enterprise

In the case of raw material 2, we can see an even greater impact of the current situation on the amount of material purchased (Fig. 9). As in the case of raw material 1, in February there was a significant decrease in the demand for the amount of this raw material, but in the following month the amount of purchased material increased significantly. So far, the demand for raw material 2 in the analysed enterprise amounted to approximately 50 Mg, which is also confirmed by the amount of material purchased in January this year. In February, there was only one delivery - 22.3 Mg. In turn, in March there was a significant increase to 137.4 Mg of purchased raw material.

Analysing Figure 10, the same trend can also be noticed as in the case of raw material 1 and 2. The only difference is the amount of raw material 3 purchased in February, because it was at a similar level as in January 2022 and in the previous months. Also due to this fact, it can be noticed that there was no sharp increase in purchases of raw material 3 in March 2022 - 299Mg of raw material was purchased compared to approximately 180Mg in the previous months. Raw material 3 is also the raw material for which the company has the largest number of suppliers. This material is provided by 4 different vendors as shown in Fig. 11.

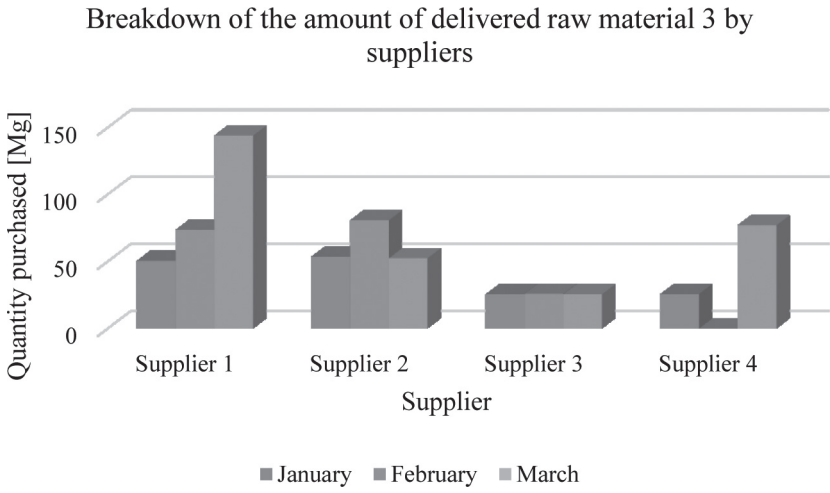


Fig. 11. Breakdown of the quantity of delivered raw material by suppliers
Source: own study based on data from the enterprise

When analysing the data in Figure 11, it can be seen how the current situation on the raw materials market has also influenced the quantities purchased from individual suppliers. Since January this year, Supplier 1 has significantly increased the amount of goods delivered to the analysed company. While between January and February the difference in the quantity of raw material delivered is only one delivery, in March there is an almost two-fold difference in the quantity of purchased raw material compared to the previous months. Supplier 2 maintains its supplies to the analysed company at a similar level and the current market situation has little impact here. A similar situation can be noticed with the 3rd supplier - the amount of delivered material remains constant. On the other hand, in the case of supplier 4, there is a clear increase in the amount of raw material supplied to the company. In January, this supplier sold less than 26Mg, in February there was no delivery, and in March as much as 77Mg of the raw material.

By analysing the above, it can be undoubtedly stated how important it is for each company to have more than one supplier of raw materials, especially in the case of strategic raw materials for production. If the company in question relied on only one or two suppliers, production could be stopped or significantly reduced by a shortage of raw materials. However, the proper management of inventories allowed the company to maintain the liquidity of production, as well as to create inventories for the next weeks of production - it is very important if it turns out that the raw materials analysed above will be even more difficult to access than is currently the case.

5. SUMMARY

Proper inventory management in an enterprise is an extremely important element of its functioning. Currently, technological support is provided at every stage of production. However, as can be seen in the analysed enterprise, the theory is not always consistent with practice. That is why it is so important that company managers are able to analyse the available data and, on its basis, adapt to the prevailing market situation. During the analysis process, it may turn out that not only one method is best to be used in a given enterprise, but perhaps a hybrid made of several methods. This, however, requires appropriate knowledge, but also actions preceded by many analyses.

Bearing in mind the constantly rising prices of raw materials, enterprises, apart from efforts to ensure continuity of supplies, simultaneously negotiate with customers in order to transfer the increase in raw material costs to the increase in sales. In the analysed company, most of the recipients are probably aware of the crisis that has emerged in the world and have confirmed the new prices. However, due to the current situation, the competitiveness of the enterprise and the competitiveness of final customers' products are declining - which may result in a reduced number of orders in the future. The customer expects high quality, but he is not always satisfied with the rising production costs. This situation may lead to the search for other suppliers of components and the elimination of companies on the market.

REFERENCES

[1] Barney J. B., *Gaining and Sustaining Competitive Advantage*, Addison-Wesley Publishing Company Inc., New York 1997.

[2] Beksiak J., *Ekonomia*, Wydawnictwo PWN, Warszawa 2001.

[3] Fertsch M. (red.), *Słownik terminologii logistycznej*, Instytut Logistyki i Magazynowania, Poznań 2016.

[4] Gładysz B. , Grabia M., Santarek K.: *RFID od koncepcji do wdrożenia. Polska perspektywa*, Wydawnictwo Naukowe PWN, Warszawa 2017.

[5] https://sjp.pwn.pl/doroszewski/zasob;5527208.html

[6] https://sjp.pwn.pl/szukaj/zasoby.html

[7] Kraśnicka T., Gładysz B., Kucińska-Landwójtowicz A.: Doskonalenie organizacji i procesów innowacyjnych, PWE Polskie Wydawnictwo Ekonomiczne, Warszawa 2020.

[8] Matwiejczuk R., *Kompetencje logistyki w tworzeniu przewagi konkurencyjnej przedsiębiorstwa*, Wydawnictwo Uniwersytetu Opolskiego, Opole 2014.

[9] Matwiejczuk R., *Koncepcja dynamicznych zdolności w budowaniu konkurencyjności łańcucha dostaw*, "Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach", 381 (2019), pp. 355-364.

[10] Mikuła B., *Geneza, przesłanki i istota zarządzania wiedzą,* [in:] Perechuda K. (red.), *Zarządzanie wiedzą w organizacji*, Wydawnictwo PWN, Warszawa 2005, pp. 11-23.

[11] Porter M. E., *Strategia konkurencji. Metody analizy sektorów i konkurentów*, Wydawnictwo MT Biznes, Warszawa 2006.

[12] Sopińska A., *Kapitał intelektualny w zarządzaniu od teorii do praktyki - wizja przyszłości*, "Studia i Prace Kolegium Zarządzania i Finansów. Szkoła Główna Handlowa", 76 (2007), pp. 139-152.

[13 Staniewski M., *Zarządzanie wiedzą w przedsiębiorstwach – przegląd badań,* [in:] Dąbrowski J., Gierszewska G. (red.), *Strategie przedsiębiorstw a zarządzanie wiedzą*, Wydawnictwo WSPiZ im. Leona Koźmińskiego, Warszawa 2005.

[14] Szymański P., *Zarządzanie majątkiem obrotowym w procesie kreowania wartości przedsiębiorstwa*, Wydawnictwo Petros, Łódź 2007.

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