



USE OF ENTERPRISE RESOURCE PLANNING SYSTEMS IN ENTERPRISES

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Abstract

Enterprise Resource Planning system (ERP) is a type of software used by small, medium and large enterprises due to the diversity of its functions and the opportunities it brings to its users. However, according to the CSO data, it is most often used by large companies. Significant differences also occur in individual voivodeships and industries.

Keywords: *enterprises, Enterprise Resource Planning Systems, ERP, innovations*

Statement of the problem in general outlook and its connection with important scientific and practical tasks

Enterprise Resource Planning (ERP) consists of three large modules used to streamline work in enterprises. The first module is used to transfer information within the enterprise between different departments (e.g. accounting, marketing, production). The second module is used for collecting and storing information about the company's customers. While the third one is used for analysing the collected information about the company's customers and using it, for example, for marketing purposes. It is a solution that facilitates the functioning of the company and provides many different opportunities that, for various reasons, are not fully exploited, so it is worth analysing and assessing the occurrence of this phenomenon on an ongoing basis.

Analysis of latest research where the solution of the problem was initiated

Research in this area is systematically carried out by the Central Statistical Office (CSO) and published in the form of Information on "Use of ICT in enterprises and households". The results of research on the use of information and communication technologies include the use of computers and mobile devices, the Internet and various online services, including ERP systems used in enterprises. The latest study was published in December 2021.

Aim of paper. Methods

The aim of this paper is to analyse the Enterprise Resource Planning Systems (ERP) used by companies in 2017 and in 2020, which offer many opportunities. In developing the topic, the method of document content analysis and a review of recent research published in 2021 were used.

Exposition of main material of research with complete substantiation of obtained scientific results. Discussion

Today, computerisation of enterprises, regardless of the size of the entity, is a necessity. The solutions used in companies are supported by IT systems using large data sets. Their proper functioning depends on coherent and integrated data. These, in turn, are necessary to create statements and process them for the needs of a specific entity. An important element in this process is the time of receiving the right information from a specific system, because using it, the manager has an opportunity to make a decision at the right time.[1] In order to manage a company effectively, specific information is needed, depending on the company's business profile. According to Cz. Cempel: "information is the content of the message capable of inducing action", therefore the task of the information system is to process and transfer the necessary information. Information systems have emerged as a result of the long-term transformation of theoretical assumptions and technologies offered by the computer industry. In the beginning, the systems served only the warehouse management area, to gradually take over the production of "Material Requirements Planning" (MRP), planning (MRP II), distribution and finance "Enterprise Resource Planning Systems" (ERP and ERP II), up to tools designed to support the electronic data exchange "Electronic Data Interchange" (EDI) [2] and satellite positioning using GPS. Considerable interest in the technology of electronic data exchange followed the entry into force of the Regulation of the Minister of Finance on the electronic transmission of invoices [3]. The most common documents sent are purchase orders, invoices, advice notes, receipts, stock levels, etc. Thanks to this technology, the documents are sent directly to the relevant application on the recipient's computer and their processing can begin almost immediately. This significantly improves and speeds up the transaction process and eliminates the risk of possible errors that could occur when sending a document by a human, e.g. via e-mail. Therefore, the basic systems which guarantee smooth and fast functioning of the enterprise are the MRP and ERP type systems. Despite the fact that they were created in the 1980s and 1990s, further improvements are constantly being made on their basis, e.g: CRM (customer relationship management) or SRM (supplier relationship management). Further modifications and changes are used till now. [4]

The article focuses on one of them, namely the ERP software system - Enterprise Resource Planning. ERP is "extensive, integrated, computer-based business operations processing and reporting software system whose primary advantage is the integration of all the company's classic functions such as accounting, finance, sales, operations into one highly integrated software package using a common database." [5]

ERP software most often supports the collection of information related to warehousing, production planning, procurement, inventory management, contact with customers, tracking delivery, accounting and finance, human resources management. ERP systems use

mechanisms allowing to analyse the effects of decisions made in various areas, such as: customer service, integration within the logistic chain, production or finances. Thanks to the use of bidirectional optimisation mechanisms, they effectively support the achievement of high operational efficiency.

The main central database on which the system operation is based is the so-called "brain" of the whole system with which individual applications exchange data. The database collects and stores various data from many areas of the company's operations.[6] In this database, new data are entered only once in one place, and they are updated automatically in all related data. Information systems that significantly affect logistics-related activities and that are supported by ERP-type information systems perform the following functions:

- initiating (drafting of documents and orders),
- planning (demand forecasting),
- monitoring (verifying the results obtained with expected customer service models),
- coordinating (planning sales and material procurement, production scheduling),
- integrating (by means of which it is possible to connect the company's system with external systems of customers and suppliers).

Enterprises divided into small, medium and large enterprises using ERP software packages to transfer information between different areas of the company's activity (e.g. accounting, marketing and production) are presented in Table 1.

Table 1. Total enterprises using ERP in 2017 and 2020 (in %)

№	Type of enterprise by its size		Enterprises using ERP packages to:		
			transfer information within the company	collect and store customer information	analyze customer information for marketing purposes
1.	small	2017 (n=84631)	18.8	18.7	12.8
		2020 (n=87065)	24.4	25.5	16.7
2.	medium	2017 (n=15507)	53.6	39.2	28.9
		2020 (n=15870)	59.8	54.3	36.1
3.	large	2017 (n=3328)	86.5	64.3	50.2
		2020 (n=3602)	90.6	82.9	68.2

Note: percentages in the tables may not sum up to 100%, because in many questions there was a possibility to select more than one answer.

Source: Own study based on CSO data.

According to CSO data, a total of 103 604 small, medium and large enterprises were surveyed in 2017, while in 2020 there were slightly more, i.e. 106 537. In these years, by far the largest number of companies that were surveyed, were selected from small entities - just under 82% and 88% respectively. Medium-sized companies employing between 50 and 249 employees also took part in the survey - their share in those years was nearly 15%. Large enterprises, on the other hand, accounted for about 3.4% of all enterprises surveyed. Table 1 also shows the exact number of small, medium and large entities surveyed in each year. In 2020, companies using ERP software packages to transfer information internally between different departments (e.g. accounting, marketing, manufacturing) noticed a similar increase of 6% with respect to 2017. Over the three years, a

noticeable increase was seen in large and medium-sized companies for collecting and storing information about their customers - 18% and 15% respectively. In 2020, they began to collect information about their customers more systematically; the reason for changes in this area may be the desire to adapt to the needs of customers by collecting data on the quantity and type of products ordered. Having such knowledge is a competitive advantage of any company due to the fact that it is able to respond relatively quickly to the needs of consumers and increase or decrease the production of certain goods. Such information is useful both during increased demand or restrictions in this area. Thus, it allows the company to adjust the workforce to its needs and transfer or train employees to departments with a higher workload. On the one hand, employees have the opportunity to improve their qualifications, competences and gain experience, and on the other hand, it allows the company to rotate employees without having to reduce its employment. Thus, it is surprising that in 2020 only every fourth small company and every second medium one carried out such analyzes. Companies using the ERP system also have the ability to analyze customer information for marketing purposes, e.g. creating individual sales offers, evaluating their customers, etc. In 2020, almost 17% of small companies, 36% of medium-sized companies and 68% of large companies used such solutions. Despite the fact that in relation to 2017 in each type of enterprise there was a visible increase in this respect, economic operators still incompetently use these opportunities to which they have access through their own database and the system already purchased to support their functioning. Companies often incur additional costs in this respect by ordering expensive statements, expert opinions or databases in order to use marketing campaigns aimed primarily at acquiring new customers.

Table 2. Enterprises using ERP by voivodeship in 2017 and 2020. (in %)

№	Voivodeship		Enterprises using ERP packages to:		
			transfer information within the company	collect and store customer information	analyze customer information for marketing purposes
1.	Dolnośląskie	2017 (n=7253)	29.1	25.7	18.6
		2020 (n=7725)	31.5	33.2	22.6
2.	Kujawsko-pomorskie	2017 (n=5083)	24.8	22.3	15.4
		2020 (n=5121)	29.8	28.6	20.1
3.	Lubelskie	2017 (n=3989)	19.2	18.9	14.1
		2020 (n=4274)	23.6	23.7	16.6
4.	Lubuskie	2017 (n=2560)	22.3	21.7	16.6
		2020 (n=2660)	30.8	25.8	17.5
5.	Łódzkie	2017 (n=6529)	27.9	23.1	16.8
		2020 (n=6749)	29.1	32.5	19.5
6.	Małopolskie	2017 (n=9451)	27.5	23.3	16.8
		2020 (n=10081)	39.2	39.5	23.6
7.	Warszawski Stołeczny	2017 (n=12597)	36.7	36.2	26.9
		2020 (n=12937)	44.2	46.2	33.6
8.		2017 (n=4977)	16.8	14.6	9.0

	Mazowiecki Regionalny	2020 (n=5077)	24.5	23.6	14.3
9.	Opolskie	2017 (n=2300)	21.5	23.2	17.1
		2020 (n=2242)	34.0	31.9	19.0
10.	Podkarpackie	2017 (n=4786)	27.8	20.1	14.2
		2020 (n=4791)	27.8	25.2	15.8
11.	Podlaskie	2017 (n=2428)	19.6	18.5	13.4
		2020 (n=2680)	27.0	27.6	18.1
12.	Pomorskie	2017 (n=6575)	23.1	20.2	12.9
		2020 (n=7007)	29.5	29.0	20.1
13.	Śląskie	2017 (n=13276)	28.1	22.1	14.8
		2020 (n=13450)	32.3	30.8	21.2
14.	Świętokrzyskie	2017 (n=2641)	22.2	17.3	12.5
		2020 (n=2606)	21.8	21.2	13.9
15.	Warmińsko-mazurskie	2017 (n=2926)	16.1	19.0	12.6
		2020 (n=2868)	22.6	24.0	15.9
16.	Wielkopolskie	2017 (n=11977)	24.4	22.3	15.2
		2020 (n=12214)	30.5	29.6	21.1
17.	Zachodniopomorskie	2017 (n=4120)	22.6	20.7	14.2
		2020 (n=4055)	29.3	25.4	16.5

Note: percentages in the tables may not sum up to 100%, because in many questions there was a possibility to select more than one answer.

Source: Own study based on CSO data.

Table 2 presents data in relation to individual voivodeships of Poland. Among the more important conclusions from the presented data one should mention:

- In both 2017 and 2020, the largest number of enterprises that took part in the survey were located in three areas in the Śląskie voivodeship, Warszawski Stołeczny region and Wielkopolskie voivodeship - their share together amounted to just under 40% of all enterprises.
- Both in 2017 and 2020, the least number of enterprises that took part in the survey were located in five voivodeships, i.e. Lubuskie, Opolskie, Podlaskie, Świętokrzyskie, and Warmińsko-Mazurskie - their share in individual voivodeships was within 2.2-2.8%.
- In both 2017 and 2020, companies were the most willing to use ERP packages to improve the internal flow of documents between individual departments. On the other hand, collected data was the least willingly used for marketing purposes. Such a trend occurred in all analyzed voivodeships.
- In 2020, all three categories (i.e. storing, collecting, and analysing information) were used by enterprises located in Warszawski Stołeczny region - over 44%, 46%, and nearly 34% respectively. A relatively high level of entrepreneurs' participation in all three categories was also observed in the Dolnośląskie, Małopolskie and Świętokrzyskie voivodeships.
- In 2020, every third company in the Dolnośląskie, Lubuskie, Śląskie, and Wielkopolskie voivodeships transferred information within the company between different de-

partments in order to streamline their work. Entities located in the Zachodnio-pomorskie, Pomorskie, Łódzkie, and Kujawsko-pomorskie voivodeships were also very close to this level (i.e.: within 29.3-29.8%).

- In 2017, only between 14.6% and 19% of companies collected and stored information about their customers in Lubelskie, Mazowiecki Regionalny, Podlaskie, Świętokrzyskie and Warmińsko-Mazurskie voivodeships. On the other hand, in 2020 almost every second company, thus by far the largest number in this category, was located in Mazowiecki Regionalny.
- The least frequent use of the CRP module was in the area of analysing the information collected about their customers and using it for e.g. marketing purposes. In 2020, this was done by slightly more than 33% of entities in Warszawski Stołeczny region. In relation to the other voivodeships, in most cases such a solution was used in one in five companies, and in many even less often.

Nowadays, where the flow of information is necessary for an organisation to operate in the market, it is essential to support it with IT techniques. It is essential to collect data effectively, to collect them and to process and analyse them not only inside the company, but also to draw knowledge from outside. According to the Central Statistical Office (CSO), this varies and depends on the company's profile.

Table 3. Companies using ERP by type of activity in 2017 and 2020. (in %)

№	Type of activity	Enterprises using ERP packages to:			
			transfer information within the company	collect and store customer information	analyze customer information for marketing purposes
1.	Processing industry	2017	29.8	22.8	16.9
		2020	34.3	31.6	22.3
2.	Generation and supply of electricity, gas and steam, water supply. Sewage and waste management.	2017	36.6	30.0	11.6
		2020	45.3	43.0	17.2
3.	Electricity, gas, heat	2017	51.3	35.8	11.8
		2020	53.2	51.7	21.3
4.	Water supply, sewage and waste	2017	32.3	28.8	10.9
		2020	43.1	40.6	16.1
5.	Construction	2017	14.2	11.6	6.6
		2020	17.1	15.2	8.5
6.	Trade and repairs	2017	29.4	27.4	21.7
		2020	36.0	37.9	26.9
7.	Transport and storage	2017	17.2	18.3	11.5
		2020	24.5	24.9	15.2
8.	Accommodation and board	2017	13.2	16.5	11.9
		2020	20.1	24.5	17.6
9.	Information and communication	2017	46.5	52.7	38.4
		2020	54.3	62.6	49.2
10.	Real estate services	2017	28.3	21.7	6.4
		2020	34.2	32.6	11.2
11.	Science and technology	2017	24.3	26.4	15.3

		2020	40.1	38.6	24.4
12.	Administration and support activities	2017	27.3	25.5	18.6
		2020	33.4	34.4	25.1
13.	Repair and maintenance of computers and communication equipment	2017	47.3	58.1	36.1
		2020	56.9	63.9	41.7

Note: percentages in the tables may not sum up to 100%, because in many questions there was a possibility to select more than one answer.

Source: Own study based on CSO data.

Taking into account the type of activity of the enterprise (Table 3), it should be noted that in 2020, in relation to 2017, in each of them there was an increase in the use of Enterprise Resource Planning packages - an increase was recorded from a few up to a dozen or so percent. ERP is most often used for information processing within the enterprise, and most rarely for various types of analysis, including marketing. More than half of the companies in the sections "electricity, gas, heat", "information and communication" and "repair and maintenance of computers and equipment" use the software to exchange information internally between different departments. The collection and storage of customer information was most common in two industries: "repair and maintenance of computers and equipment" and "information and communication" - 63.9% and 62.6% respectively. Given the type of activity, enterprises are reluctant to use ERP to analyze information about their customers and reuse it in the future. In the "construction" sector, this situation is due to the focus on the constant search for new customers, as general renovations, construction of houses, warehouses are among the low frequency of such orders. Only a few percent of consumers use the services of this industry for a second, third or subsequent time in a short period of time. Surprisingly, in e.g., 'trade and repair' or 'accommodation and board', companies are also reluctant to collect information about their customers. These are industries that consumers use relatively frequently and are happy to return to already proven products and services with which they have been satisfied. Another reason for the lack of interest by these industries may be that they have another support system or that they do not use all of its functions .

Conclusions

Enterprise Resource Planning (ERP) software is used by enterprises located all over Poland to streamline their work. However, as the CSO data show, it is still not fully utilised. Definitely, most companies use the module that allows them to transfer information within the enterprise.

It is not very optimistic, however, that in terms of collecting and storing information about their customers in 2020, only one in two companies in the Mazowiecki Regionalny did so. Whereas every third was located in the Kujawsko-Pomorskie, Łódzkie, Opolskie and Śląskie voivodeships. Thus, the vast majority of entrepreneurs are not interested in collecting and using such information. In my opinion, entrepreneurs are not able to use this tool, and thus do not skillfully use it in their entities. The situation is even less optimistic when it comes to analysing the collected information about their customers and using it for e.g. marketing purposes. In this respect, entrepreneurs from Warszawski Stołeczny

have the best results, while entrepreneurs from only six voivodeships use such information in only one in five companies.

In conclusion, it should be noted that despite the fact that companies have Enterprise Resource Planning system, they do not use all the possibilities they get in the package and are not able to take full advantage of it. This situation may occur for several reasons. Firstly, it may be due to the lack of staff or the employment of people who have not been adequately trained in this area. Management may not see the need for specialized training in this area and to employ staff possessing analytical skills that are needed in any company, regardless of the nature of its activities. Secondly, entrepreneurs are often unaware of the possibilities offered by the system. Making full use of all the modules allows, in the long term, to achieve noticeable and measurable financial benefits and the possibility of gaining a competitive advantage on the market. However, businesses do not want to wait for possible savings or benefits that might come in a year or two. What is more, the full implementation of ERP also involves incurring costs, for example for an employee training. A properly trained employee is an investment that will pay off in the future. Therefore, entrepreneurs not only fail to make full use of what they already own and have paid for, but also buy additional services or programmes on the market, which are supposed to help them analyse the market. Thirdly, companies that sell such software to entrepreneurs provide a very general training or do not provide any training at all, enclosing only a manual with basic information. Therefore, an entrepreneur who buys such a solution for his or her company usually does not know what its capabilities are. He or she simply passes them on to the employee, who is supposed to cope with them. However, if the employee is not enough motivated to take up this task, he or she will not be too committed and will do his or her job only to a minimum extent, because why should they do more if they do not have to.

References

1. Nowotyńska I., Trzepieciński T., *Wykorzystanie systemów informatycznych w branży logistycznej* [w:] Logistyka 2016;12:1647.
2. Hałas E., *Kody kreskowe i inne globalne standardy w biznesie*, Instytut Logistyki i Magazynowania, Poznań 2012:141.
3. Rozporządzenia Ministra Finansów o przesyłaniu faktur w formie elektronicznej (Dz.u. z 2005r. Nr 133 poz.1119 z dn. 14.07.2005r.)
4. Słowiński B., *Wprowadzenie do logistyki*, Wydawnictwo Politechniki Koszalińskiej, Koszalin 2008:56.
5. Barcik R., Kubański M., *Technologie wspomagające zarządzanie łańcuchem* [w:] Logistyka, wyd. Sieć Badawcza Łukasiewicz – Instytut Logistyki i Magazynowania, Poznań 2011;4:84.
6. Dudziak A., Stoma M., Rydzak L., *Narzędzia klasy ERP w strategii zarządzania systemem produkcyjnym*, Zeszyty naukowe politechniki śląskiej, Organizacja i Zarządzanie, 2017:58-