

## SAP ERP SOFTWARE AS A TOOL FOR MANAGING THE LOGISTICS SUBSYSTEMS OF AN ENTERPRISE

Małgorzata ORŁOWSKA

War Studies University, Warsaw; m.orlowska@akademia.mil.pl, ORCID: 0000-0002-8446-8764

**Purpose:** The main purpose of this article is to evaluate the capabilities of SAP ERP software in managing an organization's logistics subsystem, identify the main strengths and weaknesses of SAP ERP software in an organization, and identify the information requirements associated with identifying logistics activities.

**Design/methodology/approach:** In preparing the article, the author used both theoretical and empirical research methods, particularly analysis, synthesis, deduction, induction, comparison, generalization, as well as scientific observation with casual observation technique. The qualitative methods mentioned above were used to analyze the literature on the subject. Analysis was used to deepen knowledge in the area of the issues under study, as well as to identify their interrelationships and the relationships that exist between them. Deduction, for the process of inferring the particular from the general. Induction was used during observation. Comparison was mainly used to identify similarities and differences in the use of SAP ERP software in the various logistics subsystems. Inference was used to develop conclusions, included at the end of this article. Using the aforementioned methods, it was possible to evaluate the functionality of SAP ERP software in the management of the enterprise's logistics subsystems, to identify the main advantages and disadvantages of SAP ERP software in the enterprise, and to identify the information needs related to logistics activities in the enterprise.

**Findings:** Modern enterprises operate in a highly competitive environment, so they need to quickly adapt to changes occurring in their environment: near and far. This is possible thanks to the implementation of modern tools, methods or techniques that enable continuous management of all departments of the enterprise, including logistics system.

**Originality/value:** This article is addressed to theoreticians and practitioners of business management. Theoreticians reading this article will find a sentiment of current data on SAP ERP software and the scale of possibilities for its use. Practitioners, in turn, will find useful tips on where SAP ERP software can be implemented or how to improve the form of its use in an enterprise.

**Keywords:** SAP ERP software, management, enterprise, logistics system, logistics subsystems.

**Category of the paper:** Scientific articles.

## 1. Introduction

Today's businesses, including logistic companies, must deal with large amounts of data provided by various measurement and reporting tools enhanced by international activities. Proper execution of the logistics process must therefore be ensured by dynamically intervening in the event of disruption. Modern businesses are therefore considered dependent on the latest technology, including IT software. There are many software products and platforms available on the global market, offering both basic activities and comprehensive support for all operational areas. It allows you to manage both the entire logistics system and its subsystems and processes. One of the most popular IT software for managing businesses is SAP ERP. It is a comprehensive IT system that enables integrated management, automation and optimization of processes, leading to quality of services provided and reducing costs for companies. The topic of SAP ERP is of interest to modern researchers due to the constant demand from enterprises for effective and efficient business management tools. SAP ERP software is considered one of the most advanced and integrated management systems. It allows you to manage areas of your company's operations. The author of this article focuses on managing his company's logistic subsystem.

Procurement, manufacturing, and sales. One of the most key features of SAP ERP software is the ability to use analytics. It allows businesses to plan, monitor and control activities in real time. In the literature, the researcher works on his SAP ERP software and points to its potential use in various areas of the company, including logistics areas: "Optimizing Supply Chain Management with SAP ERP" (Kilgera, Zimmermański, 2014) . „Implementing SAP ERP in the Logistics Industry " (Gupta A., Kumar Singh R. 2020), "SAP ERP for Better Supply Chain Management" (Liu, Chiu, 2021), "SAP ERP in Logistics and Distribution. Most work bases on the use of SAP ERP software to support resource management, enterprise process management in finance, accounting, human resource management. SAP ERP with the help of data transparency will enable automation of individual processes. In recent years, this software has been enriched with additional functions such as risk management, quality management or project management ([www.sap.com](http://www.sap.com)). SAP ERP software in logistics processes plays a significant role due to functionality and efficiency, so it is often selected and implemented in both medium-sized and large companies. In addition, SAP ERP software enables the creation of corporate services and the provision of services to end users.

The purpose of this article is to evaluate the capabilities of SAP ERP software in managing an enterprise logistics subsystem, identify the main strengths and weaknesses of SAP ERP software in an enterprise, and assess the information needs of logistics operations.

## 2. SAP ERP software

SAP ERP software is derived from the ERP Enterprise Resource Planning system, a collection of interconnected applications, such as Google's online storage. This system optimizes the company's work in the areas of human resource management and logistics (Rutkowski, 2001). Enterprise Resource Planning was created through the implementation of the LRP module (Logistic Resources Planning System) and similar modules, thus enabling planning, management, and control of all levels of the enterprise. This system uses a single base in its operation, and therefore leads to the integration of enterprise operations (Pegani, 2022). There are several types of ERP systems in the literature, called integrated information systems. Among them are modular systems, consisting of independent but cooperating modules. ERP systems collect scattered data with infinite spreadsheets, then organize this chaos in such a way that the same data can be used, processed, and stored by employees at all levels of the. As P. Lech aptly notes, Enterprise Resource Planning systems streamline, systematize, and optimize the work of the entire enterprise. Which translates into productivity and efficiency of employees. These systems facilitate quality management, affecting the growth of company profits. They provide secure access to collected data, enable real-time online work using the Internet and Intranet. These systems enable automatic and comprehensive use of the financial and accounting program, reducing system maintenance costs, and preparing dependable financial and marketing analyses (Lech, 2003). SAP ERP (Enterprise Resource Planning) software supports enterprise management. Developed by the German company SAP AG in 1972, it was originally known as "Systems, Applications and Products in Data Processing". SAP ERP's first activity was solely concerned with automating financial and accounting processes. The 1980s were a breakthrough time, SAP ERP software expanded into additional areas: procurement, manufacturing, and distribution. Today it is one of the most well-known and widespread software of its kind in the world. It has been constantly evolving and improving over the years. SAP ERP software has constantly introduced new functionalities and integrated with other systems. According to a ranking conducted by Creative Saplings, presenting the world's ten largest IT companies in 2020, SAP ERP was ranked 6<sup>th</sup> (Grabiński, Piecucha, 2012). In turn, according to statistics, it was the most widely used system in the world. It was used by more than twelve million users in 2020. In Poland, almost 40% of the enterprise business software market used SAP ERP (Lysenko-Ryba, 2017). Well-known international companies have implemented it into their operations: Procter & Gamble ([www.basistechnologies.com](http://www.basistechnologies.com)) a global conglomerate that produces food, cosmetics, and household products. Coca-Cola (<https://news.sap.com/france/2004/02/coca-cola>) One of the world's best-known beverage brands, Unilever (<https://www.unilever.com/news/press-and-media>) Global manufacturer of food, cosmetics and home products. Nestle one of the world's largest food manufacturing companies (<https://www.nestle.com/news/press-and-media>). As well as: Heineken

(<https://news.sap.com/netherlands/2022>) multinational brewing company, BASF (<https://www.basf.com/>) one of the world's largest chemical manufacturers, Siemens (<https://www.sap.com/poland/products>) an international electrical engineering, automation and information technology company, and Daimler AG (<https://iot-automotive.news/sap-daimler-ag/>) car and commercial vehicle manufacturer.

### **3. Management of logistics subsystems in the enterprise**

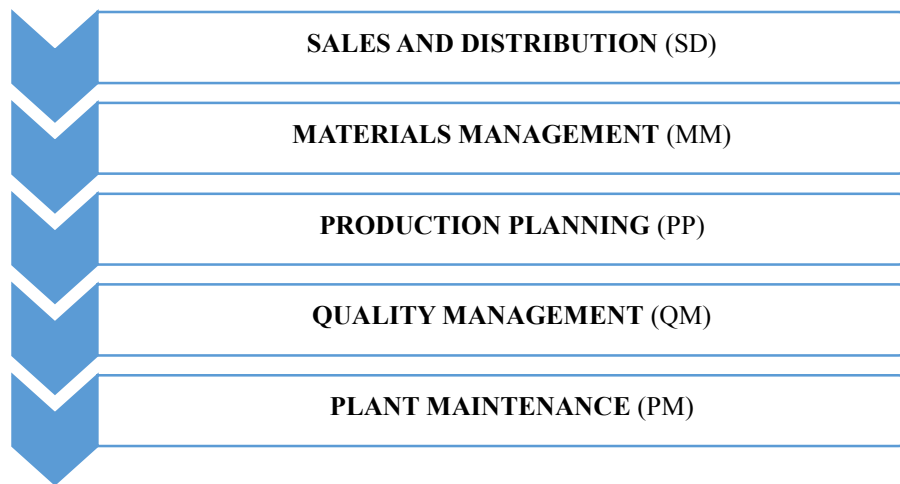
Enterprises act for their own benefit as business units authorized to trade (produce, trade or provide services) under applicable law. Every business has its own name, brand, books, movable property, real estate, liabilities, liabilities, and ownership. It represents an economic, organizational, legal and production-technical peculiarity whose purpose is the implementation of managerial decisions, one of the elements of management (Krzemińska, 2005).

Management understood as a set of actions, taken by management to implement the various processes of the enterprise (Zalewski, 2005). With the help of management, it becomes possible to achieve the goals of the enterprise (organization) effectively and efficiently, while maintaining rational economy. As well as obtaining maximum benefits with given inputs or using minimum inputs in pursuit of certain goals. Management is planning, organizing, giving orders, coordinating and controlling (Dembińska-Cyran, Jedliński, 2005). A. Zalewski says company managers use the tools available to them to achieve their goals (Zalewski, 2005). The types, methods and means of corporate management depend on the external factors that affect the company. These include increased economic interdependence with globalization, increased economic interdependence between countries, and border ambiguity in the context of international trade. The flow of capital, goods, and services, and the revitalization of SMEs. Intensifying international competition, use of the latest technology. We will provide high-quality products and services and carry out aggressive marketing. External factors also include population aging, lifestyle changes, consumer preferences and expectations. A change in employer and employee orientation that has proven to be an added value for the company. Shifting from an industrial economy to an information economy, building a new distribution network, manufacturing products that meet local needs (Penc, 2002).

Logistics in a company is a very important pillar. Generalizing, we can say that it deals with the management of movement and storage activities designed to facilitate the flow of products from points of origin to places of final consumption, as well as related information. The purpose of this management is to offer customers an adequate level of customer service at a reasonable cost (Beier, Rutkowski, 2004). A logistics system is an organized and interconnected set of elements along with the relationships that exist between them and their properties that determine the flow of streams of material goods, financial resources, and information (Nowakowski, 2011). Management, support, primary and secondary order processes (planning, execution and management of raw materials, production materials, finished goods and related information from origin to point of consumption to meet customer expectations, efficiently and economically) The literature further subdivides in-house logistics processes. Transportation, storage, inventory management, customer service, order processing, information flow. Today, logistics activities are given great importance in customer service. D.M. Lambert, J.R. Stock as in (Lambert, Stock, 1993) each of the company's logistics activities affects the product received by the customer, which should be delivered to the right customer, in the right quantity, in the right condition, in the right place, at the right time and at the right cost (Rutkowski, 2006). Customer service should be implemented at the highest possible level, as it translates into the management of logistics processes in the company. F.J. Beier, K. Rutkowski highlight that an efficient and effective logistics system is treated as the same as an asset on the company's books (Beier, Rutkowski, 2000). Moreover, it is difficult for competitors to copy. A high degree of consistency and flexibility are two of the most important characteristics of a logistics system. A change in one subsystem causes changes in other subsystems (Lambert, Stock, 1993). Management of logistics subsystems has been described by: R.H. Ballou, author of *Business Logistics/Supply Chain Management*, which is considered one of the most important studies on logistics and supply chain management. J.T. Mentzer, author of many articles and books on logistics and supply chain management, wrote, among other things: "Defining Supply Chain Management: A Historical Perspective and Practical Guide". D. Simchi-Levi, author of "Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies," which is considered one of the most important studies on supply chain design and management.

#### **4. Use of SAP ERP software in the management of logistics subsystems**

Modern IT software is indispensable for the proper implementation of company processes, including logistics. One of them is SAP ERP software. The scope of its logistical activities is shown in Figure 1. There are few publications in the literature that focus on the management of individual logistics subsystems of an enterprise using a tool such as SAP ERP software.



**Figure 1.** SAP ERP software functional modules.

Source: compiled from [www.sap-erp.com](http://www.sap-erp.com), 16.11.2023.

SAP ERP makes it possible to manage not only the entire logistics system, but also its individual enterprise logistics subsystems. It automates purchasing processes, including planning needs, negotiating with suppliers, ordering goods and monitoring deliveries. It is also possible to manage the warehouse in real time, i.e. the flow of goods, control of current inventory levels, optimization of warehouse space and tracking of deliveries. Supply management using delivery planning and tracking, monitoring the movement of goods and delivering them to customers on schedule. Production management by planning and optimizing production, monitoring progress and delivering products to customers on schedule. Supply chain management, tracking and controlling the movement of goods from suppliers to customers. Among the most well-known logistics companies that use SAP ERP software to manage their company's logistics subsystems are: Deutsche Post DHL (<https://narzedzia.dhl.pl/pl/>), one of the world's largest logistics service providers. It uses SAP ERP software to manage purchasing, warehouse, production and delivery processes. Kuehne + Nagel (<https://www.appsruntheworld.com>), a global provider of logistics services. It uses SAP ERP software to manage purchasing, warehouse, supply and supply chain processes. DB Schenker (<https://www.dbschenker.com>), the world's leading logistics service provider, has implemented SAP ERP to manage its purchasing, warehouse, production and delivery processes. UPS (<https://www.ups.com>), one of the world's largest logistics service providers, uses SAP ERP to manage warehouse, delivery and supply chain processes. FedEx (<https://psg.office.fedex.com/sap/>), SAP ERP implemented to manage purchasing, warehouse, production and delivery processes. The use of SAP ERP software is noted in all subsystems of the company's logistics system. In her study, the author focused on three main subsystems: procurement, production and distribution. In the procurement subsystem, it is used to automatically generate orders for raw materials and supplies, that is, to plan and optimize deliveries. By using this software, it is possible to avoid situations in which a shortage of raw materials can cause production downtime, and an excess of raw materials can generate

unnecessary storage costs. SAP ERP is also used to control the quality of supplies, by setting requirements that relate to the quality of individual raw materials and materials. In addition, it provides an opportunity to monitor whether the conditions of the transaction being carried out have been met. Another application of SAP ERP software in the procurement subsystem is the tracking of deliveries: raw materials and materials from the supplier to the company's warehouse. It is verified whether the deliveries are made in a timely manner, in accordance with the order. Another use of the software is inventory management (checking whether inventory levels are at the right level and whether there is a risk of running out of raw materials during production). SAP ERP enables the generation of various types of reports on raw material and material supplies, costs, quality, deliveries and inventory levels. This allows the company to analyze its procurement processes and make more informed decisions.

In the manufacturing subsystem, SAP ERP software is used to streamline processes related to production planning, execution and control. With the help of monitoring the supply of raw materials and materials needed for production, it becomes possible to detect possible problems early and prevent delays. SAP ERP is also used to manage production processes through production optimization, quality control, working capital management and production cost control. In addition, it can be used to manage inventory.

SAP software is also used in the distribution subsystem, which begins with the establishment of customer relationships and ends with the invoicing of materials delivered or services provided. With SAP ERP, it is possible to automatically generate sales documents and invoices, as well as monitor deliveries and payments. With this software, the company better controls its finances and manages customer relationships. It plans and tracks deliveries, optimizes delivery routes, manages inventory and warehouses, and tracks and analyzes company and employee performance. In addition, it enables integration with suppliers, customers and other parties involved in the distribution process, allowing the company to perform tasks faster and more efficiently. Moreover, with real-time tracking of deliveries and warehouses, the company can react faster to changes in its needs and adjust its operations to distribute products efficiently and reliably. M Chyka's article describes the use of SAP LES (Logistics Execution System), one type of SAP ERP software used mainly in the distribution subsystem. It allows full control over all activities and over every participant in the process. By interfacing with wireless mobile devices, it provides full control over all movements of goods in the warehouse. It describes how warehousing and transportation work is synchronized, as well as all activities related to external release from the warehouse using SAP ERP (Cywka, 2007).

It is worth noting that SAP ERP software is flexible and can be customized to meet the needs of a specific enterprise, which means that it can be used to manage not only a single subsystem of the company, but also finance, HR and payroll, purchasing and other areas of the business.

## 5. Research on the use of SAP ERP in the management of logistics subsystems

It is important to signify that there is other competing software to SAP ERP, offering similar functions and tools for business management, such as financial, human resources, procurement, and production management. Among the best known are Oracle E-Business Suite, Microsoft Dynamics, Infor CloudSuite, Workday Financials. Choosing the right software depends on a number of factors, such as the size and needs of the company, budget, and function requirements. Research conducted by: IDC in 2019 found that 82% of companies in Europe use SAP software in their business processes (<https://news.sap.com>). A 2018 Gartner report indicates that SAP software is one of the most popular ERP tools in the world and is used by more than 400,000 customers (<https://www.gartner.com>). A 2016 Forrester study found that SAP software is one of the best-rated ERP tools on the market and is particularly strong in financial and accounting management (<https://www.forbes.com>). In turn, the use of SAP ERP software to manage logistics subsystems, among other things, confirms: Logistics IT Company Report of 2018 (<https://www.statista.com/topics>), which showed that more than 50% of supply chain management. In contrast, a study conducted by A.T. Kearney (<https://www.kenarney.com>) in 2017 showed that using SAP software to manage logistics subsystems allows companies to increase the efficiency and effectiveness of logistics processes by up to 30%. Supply Chain Management Review report (<https://www.scmr.com>) from 2016 indicated that SAP software is one of the best-rated tools for managing logistics processes, and its use supports more efficient and flexible delivery. The above examples confirm that many studies show the benefits of using SAP software to manage logistics subsystems. What sets SAP ERP software apart is its information integration, which makes it possible to integrate information from different sources, such as production systems, finance and accounting. This allows a full view of the company's logistics, monitoring inventory, goods flow and distribution processes. Using logistics process optimization, the software enables the optimization of logistics processes such as inventory management, demand planning and production planning, leading to increased efficiency and cost reduction. SAP ERP makes it possible to monitor and manage deliveries, making it possible to ensure efficient and effective delivery of goods to customers. The software, thanks to its ability to generate analysis and reports, makes it possible to track performance and improve logistics processes. Using SAP ERP software to manage logistics subsystems, an enterprise has a complete view of its logistics. Therefore, it can improve the efficiency and quality of logistics processes, increase customer satisfaction through efficient delivery of goods. This is all thanks to the many analytical functions that SAP ERP has: Business Intelligence (BI) - which enables the review and analysis of business data, taking into account different perspectives such as volume, costs, margins, etc. Reporting and Visualizations - allows you to create and view reports and data visualizations that make it easier to interpret



and understand information. Planning and forecasting - enables businesses to draw forecasts about future business trends and events, and plan actions based on those forecasts. Cost analysis - enables companies to track and analyze costs across business areas to optimize operations and control expenses. Risk analysis - enables companies to identify and assess risks associated with various business activities, allowing them to better prepare for and respond to potential challenges.

Optimization of SAP ERP software in an enterprise involves tailoring the software to the needs and business processes of a given enterprise, so as to best support its operations and enable effective management. This optimization can include several aspects, such as: configuration of the SAP ERP system, i.e. adapting it to the specifics of the company's operations, so as to best meet its needs. Integration with other systems, for example, warehouse systems, production management systems, etc. Optimization of business processes: purchasing processes, warehouse processes. Implementing SAP ERP software can involve several drawbacks, such as high costs, the implementation process, customization of the software to meet the needs of the company, and difficulties in integrating with other systems. The implementation of this type of software should be preceded by a thorough analysis of cost-effectiveness, as well as a detailed plan for carrying out this operation, considering possible difficulties in the functioning of the organization. It is possible to prepare the software along with data migration, and then successively switch individual departments from the old type of software to software based on new technologies.

## 6. Summary

SAP ERP has undergone a major update in recent years, adding new tools and capabilities such as cloud integration, big data analytics, and machine learning. You can expect SAP to continue developing software to meet the requirements of increasingly complex business processes and market requirements. SAP ERP is used to manage various aspects of a company's operations, such as: B. Finance, Human Resources, Production, Logistics, Sales, etc. SAP ERP integrates data from different parts of the company, giving you better control over your business processes and facilitating more informed decision making. SAP ERP is widely used in many industries such as industrial, retail, service, and public sector. It is software that can adapt to the needs and optimize business processes of different types of businesses, small businesses and large enterprises. The planned innovations of SAP ERP keep pace with the dynamic changes of the modern world and point the way for this type of software transformation. As one of the most important business management tools in many industries, SAP ERP will gradually offer more capabilities than traditional data collection and analysis. A trend affecting the future of SAP ERP is the growing demand for cloud software (cloud computing).

Many companies already use SAP ERP software in the cloud. This saves time and money and makes managing your data and business processes easier and more flexible. Another key trend is the growing demand for software integrated with the Internet of Things (IoT). SAP has already implemented his IoT-based solution in ERP software, enabling companies to track and analyze data from various IoT devices to improve business processes. Therefore, it is safe to assume that many companies in various industries around the world will continue to use this software to better manage their data and business processes. With SAP ERP in managing the logistics subsystems within your enterprise, you can automate and optimize all processes, thus increasing efficiency and profitability. Using SAP ERP software is therefore valuable to your company for several reasons. This enables the automation and optimization of logistics processes, leading to improved quality and reduced operating costs. SAP ERP software is a flexible and scalable system that can be customized to suit the needs of any business. In addition, the system allows better control and management of all aspects of logistics that are critical to a company's success.

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