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# The Importance of WMS and ERP Systems in the IT Structure of an Enterprise

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**Abstract**
The vast majority of modern logistics and/or manufacturing companies utilise two types of management solutions as their primary IT systems: WMS (Warehouse Management System) and ERP (Enterprise Resource Planning). There are several reasons for this approach, including the complementarity of key supply chain, warehouse, and internal process management functions. However, we increasingly hear about the limitations of these systems (despite their evolution) and the need to extend them with new solutions that more precisely fit into the growing needs of the market, and therefore in increasing the efficiency of enterprises in a market that is no longer limited to a specific area, but has become a global market.
At the same time, it should be emphasised that according to the Grand View Research report - Warehouse Management System Market Size 2024, "the global WMS market is estimated at USD 2.88 billion in 2024, with a forecast of up to USD 8.38 billion in 2030."[1]
In this article, the authors try to present and justify two theses: to demonstrate the problem of low awareness of the management staff regarding the existence of other (new) solutions, and to indicate factors influencing the lack of interest in implementing new solutions.

**Keywords:** logistics, IT systems, future.

[1] https://www.grandviewresearch.com/industry-analysis/warehouse-management-system-wms-market.

## INTRODUCTION

As mentioned above, the leading IT systems in Polish enterprises are WMS and ERP solutions. This is due to several factors: the high popularity of these systems, widely discussed in the industry press, publications, manuals, and in the offerings of warehouse companies, which, in addition to their core business (e.g., providing internal transport equipment or racking systems), increasingly offer support for IT system implementation as part of their comprehensive services. The need to implement WMS solutions is particularly emphasised by forklift manufacturers offering automated or mobile trucks to ensure optimal use of Industry 4.0 and Warehouse 4.0 technologies within a given enterprise.

Such activities obviously have a strongly motivated basis for integration, either of an existing system or the implementation of a new one, which, in combination with the fleet management system (fleet manager), will show its full potential.

The second system commonly used in enterprises is ERP solutions, often the "heart" of the company. Choosing this system for many businesses (those with low volume, traditional business operations, i.e., lack of automation) is the optimal choice, ensuring the efficient operation and management of the company in departments such as finance and accounting, inventory and purchasing management, sales, production planning, basic human resources, and general asset management.

However, as companies develop and need to offer "something new", in order to function appropriately in such a highly competitive environment, it is necessary to reach for new solutions that focus on specific areas of the company and whose task is to optimise them.

It is important to remember that WMS and ERP systems as tools supporting companies in their operations (warehouse operations management and resource planning) date back to the 1990s (Jacobs, Weston, 2007, pp. 357-363). After more than a quarter of a century, it is time for a change in approach and the perception of WMS and ERP as a cure-all.

Changing the approach and "opening up" to new solutions also requires broadening the awareness of the management staff, who in many cases follow the "do-don't-touch" principle, thus closing themselves off to tools that can significantly improve the functioning of the company in terms of efficiency and flexibility, often without increasing employment, or even keeping it at the current level or lower.

An important aspect that must be addressed is the issue of ownership of enterprises in Poland. The logistics industry is dominated by entities dependent on foreign capital, usually operating as branches of major companies. Most strategic decisions are made not by branch managers but by parent companies, corporate boards, or (foreign) investors, who are often unfamiliar with the local market realities and make decisions based solely on financial criteria. The role of managers in Poland it comes down to adopting pre-imposed decisions, directions of strategy and development, in which the company is to develop.

Tables, numbers, and graphs cannot capture the problems, technical opportunities, or information that can be avoided or gained by implementing a given solution. Making decisions remotely or delaying time (for example, due to the need to verify information or a management meeting) can render the proposed solution obsolete, and the company may lose its chance for success.

The aim of this study is to present survey research on the awareness of the use of IT systems in logistics for managing specific processes, to discuss the estimated implementation costs and the expected payback period (ROI), as well as to analyse the benefits resulting from the use of additional systems, such as WCS (Warehouse Control System), WES (Warehouse Execution System) or HRM (Human Resource Management), which in interaction with basic systems can create a coherent, integrated ecosystem. The authors consciously do not discuss modern solutions such as machine learning, artificial intelligence, digital twins, blockchain and IoT, and cloud computing, treating them (although they are currently crucial for companies aspiring to be modern) as supporting tools and developing the considered logistics systems, dedicated to specific areas, and not replacing them.

## 1. THE PERFECT DUO: WMS AND ERP?

ERP and WMS systems are the most frequently used IT systems in Polish enterprises.[2] While fulfilling a central role, they do not solve all the problems facing modern logistics. These problems stem primarily from the globalisation of trade and, consequently, global competition, and the pressure to optimise a company's total operating costs (prime costs, customer service costs). Along with globalisation and access to markets that seemed inaccessible just a few years ago, the social awareness of

[2] Jurczak, M., Transport and warehouse management in the era of digitalization, Logistics and quality 4/2022, Forum Media Polska.

consumers and customers is growing, leading to a customer-to-company relationship, rather than a company-to-customer relationship as before. Today's customers are aware of their rights (often forgetting their responsibilities) and can be demanding, knowing that using modern tools, they can influence suppliers, manufacturers, and retailers both directly and indirectly. One negative online review requires a dozen, sometimes even dozens, of positive reviews to offset the situation. Therefore, companies, whether they like it or not, must ensure the quality of customer service at all stages—from order placement to after-sales service.

Another issue that modern companies must include in their policies is sustainable development. Nowadays, it is no longer enough to simply deliver goods in accordance with the 7R principles, but it is also necessary to take and implement actions aimed at protecting the natural environment and eliminate, as much as possible, activities that contribute to its degradation.

In the light of the above, it can be seen that although both ERP systems, which are tools for the overall management of enterprise resources, integrating HR, purchasing, production, sales and financial processes (Monk, Wagner, 2012), and WMS focusing on the control of warehouse operations (receipt, recording, storage, inventory control, picking, issuing),[3] enable coherent management of information and material flow, but they require support from lower-level systems that focus on precisely defined and specific tasks for which they were created. Examples of such programs include WCS systems responsible for controlling warehouse automation (e.g., AutoStore warehouses, shuttles, AS/RS, and sorters), and WES systems designed to optimise flows and dynamically assign tasks (in the modern warehouse solutions mentioned above) or better and more comprehensive human resources management supported by HRM systems.

[3] Jurczak, M., "From A to Z – WMS Report", https://www.logisticzny.com/biblioteka/w-magazynie/item/8379-od-a-do-z.

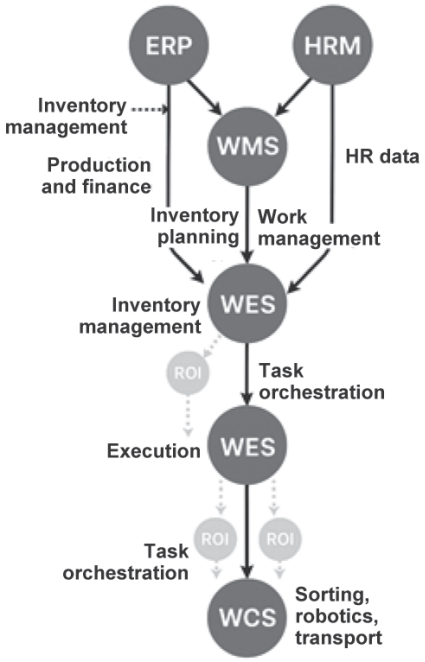


Fig. 1. Schematic diagram of possible integration of WMS, ERP, WES, WCS, HRM

The development of these systems - especially WES and WCS - results from the increasingly developing Industry 4.0, Warehouse 4.0 and the Internet of Things, enabling control, optimisation and real-time monitoring of not only entire modules, sets or workstations, but also individual devices, machines and sensors, by using their connection to the Internet and the ability to access them (control, configure, monitor parameters) from anywhere in the world, wherever there is Internet access.

Unfortunately, for many companies, the implementation of WMS and ERP systems is the end of activities related to with their computerisation. Managers do not show initiative towards developing their existing systems with solutions dedicated to a given area, or even worse (in the case of newly established companies), they somehow automatically (subconsciously using the information they have about ERP and WMS systems) decide to implement them, without paying attention or analysing whether these are the best solutions dedicated to this specific case and ensuring full functionality. This may further result in overpaying for systems that are later used only for this purpose, up to a certain percentage of its functionality, or even, in extreme cases, to abandon such a system and decide to implement a new, more adapted system.

## 2. SYSTEMS AND MANAGERS' AWARENESS

The authors' survey of various management levels in the logistics and manufacturing industries revealed that 95% of companies use ERP systems (in the manufacturing industry), and 92% use WMS (primarily logistics companies). 12% report having or planning to implement specialised systems, including WCS systems, 9% WES systems, and 16% HRM systems. The results of the initial survey confirm the authors' thesis that companies are "locked" to two products that are common, talked about, and taught at universities. One reason for this is a lack of knowledge about alternative solutions (in the case of inefficiency issues, HR interventions are most often undertaken, which provide a short-term fix), and the limited media coverage of alternative solutions. HRM systems do not directly influence the optimisation of logistics processes, but the authors concluded that their indirect impact (planning and allocation of human resources, competence and training management, recording working time and efficiency, labour cost analysis and reporting (Bednarkiewicz, Warwas, 2023, pp. 31-35) also translates into benefits for the enterprise.

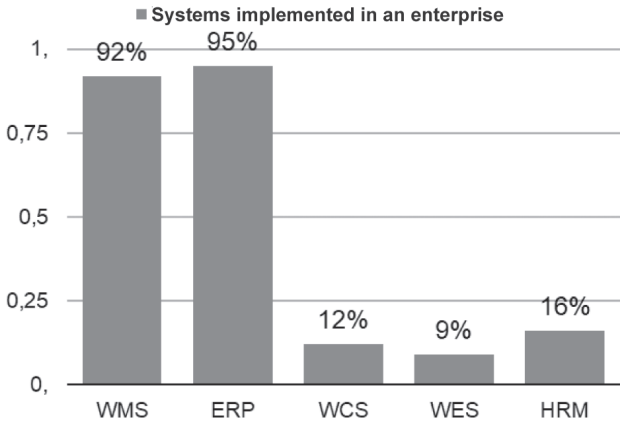


Fig. 2. Chart illustrating the use of IT systems (own work)

The second extremely important aspect is the already mentioned dependence on corporations with foreign capital.4 According to data from the Central Economic

[4] Economic activity of enterprises with foreign capital in 2023 - https://stat.gov.pl/obszary-tematyczne/podmioty-gospodarcze-wyniki-finansowe/przedsiebiorstwa-niefinansowe/dzialalnosc-gospodarcza-przedsiebiorstw-z-kapitalem-zagranicznym-w-2023-r-,26,7.html.

Information Centre (*Pl.: COIG*), as of January 28, 2025, there were 104,785 companies with foreign capital operating in Poland, or whose beneficial owners are citizens of other countries.[5]

It is the headquarters that decide on the implementation of specific solutions and IT technologies, implementing global technological standards within the international structure to ensure consistency of processes across the entire capital group, without delving into the issue of what a given branch does, what devices or technology it uses.

Industry reports and case studies confirm the fact that corporate capital dominance, in the vast majority of cases, involves the imposition of global IT systems (e.g., corporate ERP/WMS platforms), which for some subsidiaries may mean limited supplier or offering choices. This can lead to a situation where the system is completely misaligned with the specifics of production or logistics, and therefore may be underutilised, forcing the given division to rely on external systems that must be integrated with the existing IT solution, thus generating additional costs.

Of course, such actions cannot be generalised, as there are cases where local branches have gained full or partial autonomy in selecting IT systems. An example of such actions is Poland Tokai Okaya Manufacturing (a subsidiary of the Japanese companies Okaya & Tokai), where management managed to implement a Polish ERP system instead of a global system,[6] or Ternaeben-PL, a company belonging to the German concern Ternäben Service, which extended the Microsoft Dynamics system with local modifications.[7]

Ownership structure often influences the implementation of IT strategies, as determined by company boards and/or investors. One example of such actions, as well as the search for savings, is the dismantling of local IT departments and transferring their responsibilities to central teams or markets where the hourly rate is significantly lower. According to the company's Global Call Center Location Trend Report (2025),[8], the leading regions are Africa (17,400 new jobs), the Philippines (16,955 jobs), and Latin America and the Caribbean with 14,560 new jobs9However, companies retain dedicated staff who, in addition to their standard duties, are

5 https://www.coig.com.pl/inwestorzy-zagraniczni-w-polsce.php.
6 https://ptom.com.pl/.
7 https://erp24.pl/case-studies-erp/26803-ternaeben-wykorzystuje-braniowy-system-erp.html.
8 https://www.siteselectiongroup.com/2025-global-call-center-location-trend-report.
9 https://info.siteselectiongroup.com/blog/site-selection-group-releases-2025-global-call-center-location-trend-report.

also tasked with managing IT equipment inventory, which is most often limited to purchasing accessories (mice, keyboards, toners) or issuing computers to new employees and accepting IT equipment from those leaving their employment.

However, all activities focused on developing functionality, configuring, and implementing new solutions take place at headquarters and are then distributed remotely to branches. This significantly limits managers' ability to make decisions and explore new directions in IT systems.

## 3. RESEARCH METHODOLOGY

The presented research results were obtained as a result of an online survey conducted among people responsible for logistics and/or production processes in selected enterprises - managers, logistics and production managers, IT specialists.

The survey was addressed to 70 companies from the logistics and production sector, and included small and medium-sized and large enterprises (the vast majority (80%) of them are local branches of international corporations). The method of selecting respondents is not random (targeted at the logistics and production sectors). Therefore, the authors treat the obtained results as conditional and illustrative, and not representative of the entire sector in Poland. The obtained results were processed and systematised.

The aim of the study was to determine the level of awareness of the existence of WCS, WES and HRM systems, the level of their implementation and the perceived barriers when implementing new IT solutions.

The survey questions were divided into 3 groups:

1. Knowledge of the functions and areas of operation of WES, WCS and HRM systems in the enterprise environment
2. Decision-making structure for the selection of IT systems in the organisation
3. Technical challenges of implementing and adapting IT systems in enterprises

The first question concerned the type of logistics systems currently in place or being implemented within the enterprise – 92% of respondents indicated WMS solutions, 95% indicated ERP. Specialised systems such as WCS were indicated by 12%, WES by 9%, and HRM by 16%. The authors would like to emphasise that some respondents indicated using more than one system.

In the first block, respondents were also asked the following questions (possible answers were: "*I know*"; "*I don't know, but I've heard*" and "*I don't know, I haven't heard*"), and the results presented are (predominant answers):

- Do you know what the WES system is? - 51% of the answers are "I don't know, I haven't heard of it"
- Do you know what the WCS system is? - 54% of the answers are "I don't know, I haven't heard of it"
- Do you know what an HRM system is? - 85% of the answers are "I know"
- What is the difference between WCS and WMS - 38% of responses are "I don't know"

Some questions, due to the broader context, require providing (as survey results) all answer variants:

- Do you have knowledge about the differences between WES, WCS, WHR - 42% chose the answer no detailed knowledge, 26% no general knowledge, 32% know the difference.
- Is the implementation of dedicated systems being considered (without specifying a specific solution): 12% indicated WCS, 18% HRM, 9% WES, 61% are not planned.

The second block of questions regarding IT systems and the results are (predominant answers):

- Who decides on the choice of IT system in the enterprise - 72% of responses indicated foreign headquarters
- What limits the implementation of local solutions – according to 48%, corporate standards

The questions from the third group, being open-ended questions, focused on technical issues rather than general ones, and therefore were subjected (by the authors) to a slight analysis and adjustment:

- What are the barriers to implementing dedicated systems: 54% of respondents indicated cost, 38% lack of knowledge and the need for training, 8% other
- Are corporate global technological standards adapted (take into account) the realities of the Polish market? 49% of respondents answered that they are not fully adapted, 21% that they are adapted, and 30% that we can adapt them.

The survey results confirm what we observe in enterprises located in Poland – most companies limit their system implementation to two types: ERP and WMS.

Additionally, and perhaps surprisingly, they reveal a serious problem among management staff: a knowledge gap among managers.

People in managerial and decision-making positions are expected to possess comprehensive knowledge necessary to efficiently manage company processes. Lack of familiarity with more specialised tools almost disqualifies them. This demonstrates that training (educational programs for management staff, industry-specific training and conferences, publication of case studies), it is necessary to start from the top if the company wants to remain on the market. Financing for such training can be obtained, among others, from European Funds.

Managers (with the appropriate knowledge) rarely consider integration with more specialised systems that could increase flexibility and automation (Yasser & Khalifa, 2025). Analysing the survey results, it turns out that dependence on parent companies is a problem. Respondents also emphasised that costs (both of the software itself and implementation, as well as employee training) and a lack of knowledge about the potential benefits are also barriers.

This phenomenon is even more dangerous when one considers the development of digital technologies. The concept of modern warehouses assumes the seamless cooperation of various types of systems (İyigün, Görçün, 2022) - in addition to those mentioned above, also BMS (Building Management System), i.e. a network of hardware and software enabling centralised control and monitoring of various building systems, EMS (Energy Management System) dealing with the management and regulating the flow of energy produced by renewable sources, or combining them into a building automation and control system (BACS). Combined with a wide range of topics related to Logistics 4.0, such as warehousing, Big Data, 3D printing, robotics, and cloud computing, we obtain a new facility – the Smart Warehouse.

Analysing a company's own needs, drawing the right conclusions, and implementing appropriate solutions enable greater operational efficiency, cost reduction, and competitive advantage. McKinsey research shows that system integration can reduce operating costs by up to 20%.[10]

[10] McKinsey & Company, Digital logistics: Technology race gathers momentum, 2023, https://www.mckinsey.com/capabilities/operations/our-insights/digital-logistics-technology-race-gathers-momentum.

## 4. IMPLEMENTATION COSTS (TCO) AND RETURN ON INVESTMENT (ROI)

Choosing a specific solution requires (in addition to specifying the expectations and requirements for the system) a detailed analysis of implementation costs and the payback period. Every IT (logistics) system, including ERP and WMS, requires financial investment. This cost includes software licenses, IT infrastructure costs (networks, servers), implementation work, integration with other systems, and employee training. Choosing increasingly common cloud-based solutions can partially reduce infrastructure costs (no need for dedicated servers or server rooms). However, it's important to ensure that no additional subscription fees will arise in the long term. Discuss with the solution provider how to respond to technological and technical threats (such as server failures at the provider's site, power outages) that may impact the company's operations.

The total cost of implementation and maintenance (TCO - Total Cost of Ownership) of the selected system depends on many factors (scale, degree of automation, sales channels, SLA-Service Level Agreement requirements) and it is impossible to clearly determine the value - the cost that companies have to incur, but it is generally assumed that it is about 1-3% of the company's annual revenues.[11]Therefore, the values given below are market ranges and not specific amounts.

The situation is similar with the payback period, which is a key indicator of the effectiveness of implementing an ROI (Return on Investment) system – the ratio of profit to incurred expenditures, depending on the size of the company, turnover or level of integration, it is usually 3-5 years.[12]

It is important to remember that both TCO and ROI must be calculated based on numerous variables: a detailed process audit, simulations (e.g., using a digital twin), scenarios comparing on-premises vs. SaaS models, implementation risk analysis, and integration costs with existing IT infrastructure. Only such an in-depth analysis will allow us to determine whether the planned implementation will be acceptable to the company.

[11] https://symfonia.pl/blog/rozwoj-firmy/ile-kosztuje-erp/.

[12] https://www.enova.pl/blog/wszystko-o-erp/roi-erp-ile-wynosi-jak-policzyc-czy-oplaca-sie-zainwestowac-w-system-erp.

WMS systems are at a similar level to ERP systems, and the payback period is on average a year shorter. This is due to the ongoing benefits resulting from error reduction and shorter picking times.

The widespread availability and good marketing of ERP and WMS systems are reflected in scientific studies and expert considerations, indicating the growing importance of ERP and WMS systems in logistics and production. These implementations require significant investment, but – according to the aforementioned studies – translate into reduced operating costs and a quick return on investment (Jurczak, 2024).

A lower level of overall sophistication and a focus on specific areas translates into significantly lower implementation costs for HRM and WCS solutions. Implementing HRM systems costs approximately 100,000-300,000 PLN, and ROI (thanks to benefits such as improved resource planning, control, and reduction of overtime) can be achieved within as little as two years.

WCS class systems, as a supplement to the WMS system in the field of controlling automatic devices in the enterprise, enabling smooth control of material flow (D'Andrea, 2012, pp. 638-639), add costs related to automatic devices. Therefore, the costs the enterprise must incur are correspondingly higher than in the previous case. Depending on the level of sophistication, the amounts range from PLN 200,000 (in the case of simple control systems) to several million PLN (complex integration with automation). Higher costs and a lower degree of achieving rapid, high benefits automatically translate into a longer payback period: 2-3 years for large-scale and process-intensive warehouses, up to 4-6 years for smaller enterprises.

WES systems combine the functionality of ERP and WMS systems (consolidating WMS functionality using information obtained from ERP) (Modzelewska, Borowski, Kaizer, 2017, pp. 72–83), becoming a coordinator of operational processes. They are ideal for highly automated warehouses, where efficient operation requires dynamic, real-time resource synchronisation (Meller, 2023). The average implementation cost is PLN 500,000 to PLN 1 million, and the return on investment is achieved after an average of 2–3 years.

The values given above, both in terms of amount (as mentioned earlier) and time, are indicative, and the exact implementation costs and payback periods for the system investment result from many variables, which means that in two seemingly identical companies the differences may be significant.

## SUMMARY AND CONCLUSIONS

Analysis of research results and industry literature allows us to draw the following conclusions:

1. Most companies operating on the Polish market use WMS and/or ERP systems (Gajoszek, 2011)
2. Among some management staff there is a lack of knowledge about more specialised IT solutions which, in combination with the existing systems, can improve and elevate the processes taking place in the enterprise to a higher level
3. Implementing additional systems can not only increase operational efficiency but also contribute to sustainable development, for example, through optimal energy management, improved working conditions and employee development, or better utilisation of company resources. Such actions are positively assessed by the general public and enhance the company's image in terms of corporate social responsibility (ESG).
4. Shaping the company's IT policy globally (by foreign headquarters) may translate into software not being adapted to local variables and to the lack of initiatives by local branches to implement new solutions that would have a chance of achieving benefits in the Polish reality.
5. Analysis of implementation costs and return on investment period of additional systems is usually characterised by a shorter payback period and bringing benefits almost from the first day of implementation.

Gąsowska (2014, p. 291) notes that "today, logistics managers managing logistics processes must make decisions quickly based on enormous amounts of data, in conditions of increasing uncertainty and complexity of the environment. An appropriate information system is a prerequisite for achieving high efficiency and effectiveness of logistics processes. It creates the basis for solving logistics problems on a global scale, in changing market conditions. It is obvious that an information system used as a tool supporting logistics management should be adapted to the company's strategy."

Warehouse managers, given their responsibility for the operation of the enterprise, should strive to maximise profits and seek solutions that reduce the high costs associated with warehousing. The market is forcing them to adopt modern technologies (Malanowska, Fajfer, 2011).

Modern businesses must be constantly on the move—they cannot afford stagnation or routine in their operations or perception of their environment. The logistics

industry is particularly proficient in rapidly adapting to changes in their environment (examples include the Covid-19 pandemic and the conflict in Ukraine).

Although ERP and WMS systems remain the foundational systems for enterprise digitalisation and have undeniable foundations, their dominance and functional limitations limit transformation and diminish the importance of other solutions. Analysis of the research results indicates that cost concerns and potential lack of financial resources are the main barriers to implementing new systems in the surveyed enterprises, a finding confirmed by Gąsowska's research (2014, p. 297).

The research results also indicate the need to increase awareness of the existence of systems such as WCS, WES, and HRM. Systems that are well-suited to specific needs and, of course, in combination with key tools, can create a coherent, sustainable, and efficient logistics environment. In the era of Warehouse 4.0, system integration is no longer an option, but a necessity, delivering higher efficiency and a real contribution to sustainable development – through reduced emissions, energy savings, and improved human resource management.

A complex system architecture requires that existing core solutions such as WMS and ERP be supported (depending on the company's needs) by an execution layer in the form of WCS and WES systems, or HRM modules. WCS is responsible for real-time order scheduling, controlling conveyors, robots, and pick-to-light/voice devices, translating the warehouse strategy from the WMS into specific equipment actions. WES, in turn, coordinates workflow at the operational level, allocates tasks between automated resources and personnel, and monitors the performance indicators of individual stations. The HRM module complements this structure by automatically planning employee schedules, predicting their utilisation, and reconfiguring teams as needed to maintain consistent productivity.

Only the close cooperation of these four layers – strategic planning (ERP), warehouse management (WMS), execution control (WCS/WES) and human resources management (HRM) – allows us to fully utilise the possibilities of artificial intelligence, which is increasingly gaining ground in logistics and production.

Only then can ML (machine learning) algorithms analyse data from the ERP and WMS, forecast demand, and, through WCS and WES, immediately implement optimised robot routes and picking schedules. An HRM organisation's human resources management system, fueled by operational data, can dynamically adjust

staffing to current needs, creating a disruption-resistant and energy-efficient work environment.

Therefore, the answer to the question "WMS and ERP – is that all we need and can afford?" should be "no." There are many types of systems available to modern logistics, and it is only up to us, the managers, whether and which we want to use. Unless, of course, we want to return to the era of "paper and pencil."

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