WMS MARKET REPORT COMPACT 2024

FRAUNHOFER INSTITUTE FOR MATERIAL FLOW AND LOGISTICS // TEAM WAREHOUSE LOGISTICS

WAREHOUSE LOGISTICS

Trends and Developments of the Market for Warehouse Management Systems

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Introduction

»The logistics IT market is characterized by dynamic change, driven by innovations such as AI and cloud-based systems. Companies need to respond strategically in order to fully exploit the opportunities of digital transformation and manage risks. In the face of turbulent market conditions, flexible, efficient and resilient solutions are crucial in order to remain competitive and set new standards.

The warehouse logistics team at the Fraunhofer Institute for Material Flow and Logistics IML has been operating one of the world's leading information platforms for comparing logistics IT systems, including warehouse management systems (WMS), transport management systems (TMS) and resource planning systems (RPS), for over 24 years. In this market study, the team analyzes trends and developments in the WMS market, standard WMS and WMS projects.

With the participation of almost all relevant WMS providers in the DACH region and Italy, warehouse-logistics.com offers comprehensive information on the WMS market and current industry trends.

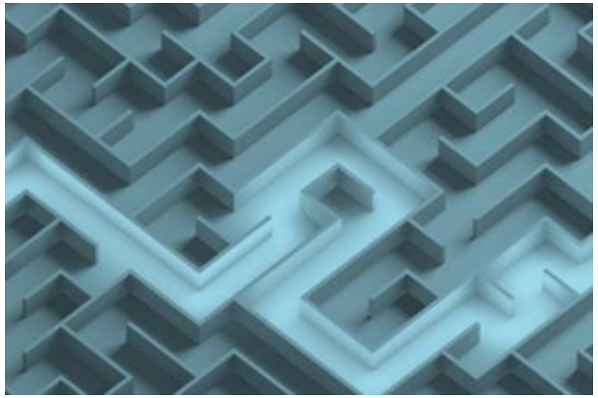
This WMS MARKET REPORT COMPACT 2024 summarizes the key findings.

The »Logistics IT Online Selection« tool is suitable for selecting IT systems in line with requirements and provides support with comprehensive benchmarking functions.«

Laura Malberger
»Team warehouse logistics«
Quality assurance & publications

Linda Maria Wings
»Team warehouse logistics«
Strategy & Development

Methodology



The WMS MARKET REPORT was first published in 2007. Since then, the successful publication has been an integral part of the »Team warehouse logistics« service portfolio. The WMS MARKET REPORT COMPACT 2024 shows essential trends as well as possible development potentials of the WMS market. It contains numerous analyses and evaluations of the functionalities of Warehouse Management Systems and WMS project planning. In order to bundle the findings of the analyses in a descriptive way, the study deals with partial aspects of WMS Market, Standard WMS and WMS Project.

For the warehouse-logistics.com platform, around 100 systems are validated annually by the »Team warehouse logistics«. The main findings about the development of the market and the systems are made available to the public in a two-year cycle with the WMS MARKET REPORT as a comprehensive market study.

To collect the data, selected aspects from the WMS questionnaire are evaluated, which are queried during validation processes and stored in the »Logistics IT Database«. The questionnaire comprises a total of nearly 3.700 aspects. It is adapted annually to the current trends and developments. After a successful validation, the information is released anonymously for evaluation and analysis. By linking different questions, correlations between company and market structures are highlighted.

In addition, all »WMS Reference Projects« listed on the warehouse-logistics.com platform are validated and evaluated. By comparing the statements of WMS providers and WMS users, a representative overview of prevailing trends and developments is created.

In addition, the market report addresses trends and developments from current key research areas. The contents and results are based on research findings. All aspects are presented graphically and underlined with text.

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THE WMS MARKET

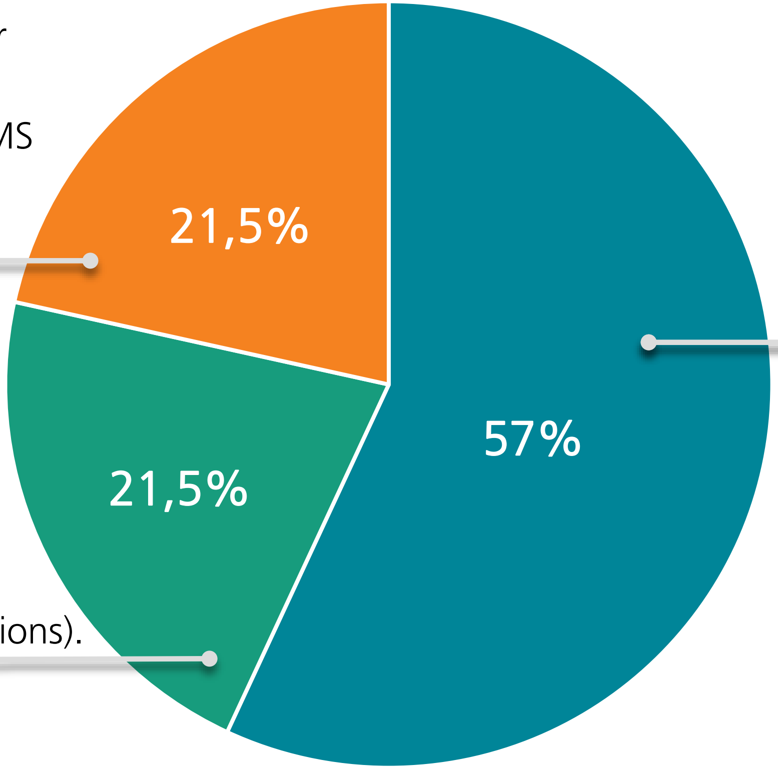
Provider Types · Market Presence & Expertise · Employees · Success Factors · Turnover · Trends · Market Volume · Cloud Solutions · Partnerships · Internationalisation · Growth Factors · AI

Provider Types

Differentiation based on the Product Portfolio of the WMS Providers

The integrator often acts as a general contractor and supplementary offers material handling equipment (»one-stop shop«). In general, the WMS is highly integrated into the material flow control system.

The core competence of a »pure« WMS provider is software for the warehouse – possibly with focus on dedicated industry sectors. This provider type might offer supplementary warehouse-related software (e. g. Forklift Control Systems, Pick-by-Voice solutions).



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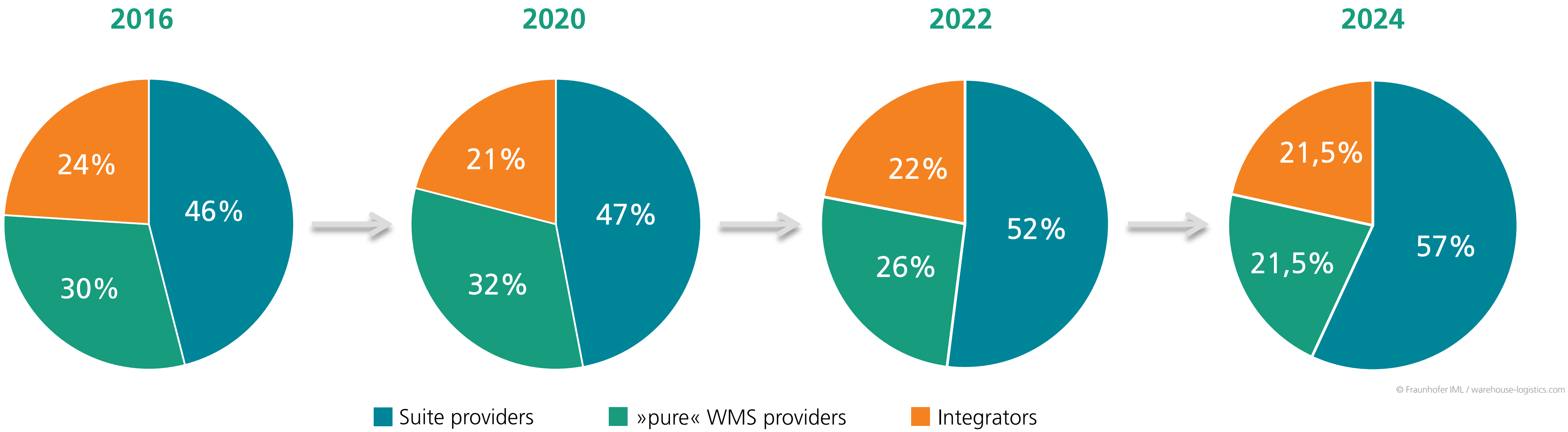
A WMS of a suite provider is mostly part of a broader software suite (e. g. ERP / SCM system) and generally features a higher level of integration in intercompany or multi-site modules and functions of the business suite.

Most WMS providers see themselves as suite providers. The proportion of »pure« WMS providers has continued to decline and now corresponds to that of the integrators with 21,5% each. The classification by provider type provides an indication of the providers' functional focus. Depending on the project scope and requirements, the specific strengths of the provider types cancan significantly influence the success of a project.

Development of Provider Types

Development of the Distribution of Provider Types from 2016 to 2024

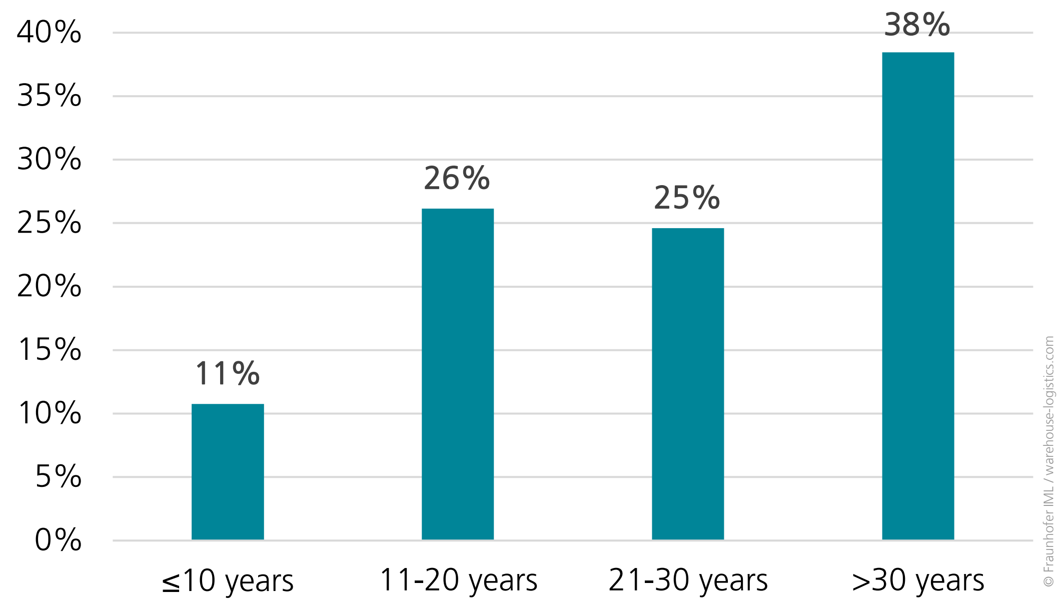


57% of the WMS providers surveyed classify themselves as suite providers and thus focus on the provision of multiple, integrated system landscapes. The trend towards expanding the portfolio has continued for 14 years now. While the proportion of integrators has remained largely stable, the proportion of »pure« WMS providers has continued to fall and has increasingly shifted towards suite providers. The project experience of »Team warehouse logistics« shows that a modular expansion of classic warehouse software is becoming increasingly important due to process-related requirements.

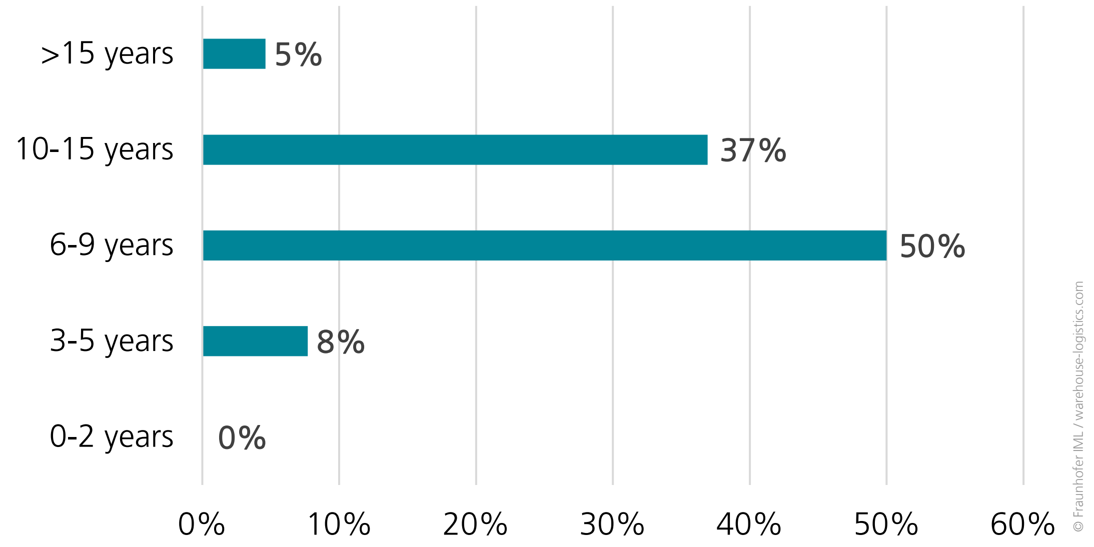
The given data is based on the statements of the WMS providers.
The data for 2016, 2020 and 2022 is taken from the WMS Market Report Compact 2022.

Expertise of WMS Providers

Market Presence of WMS Providers



Employment Period of Employees in the WMS Sector

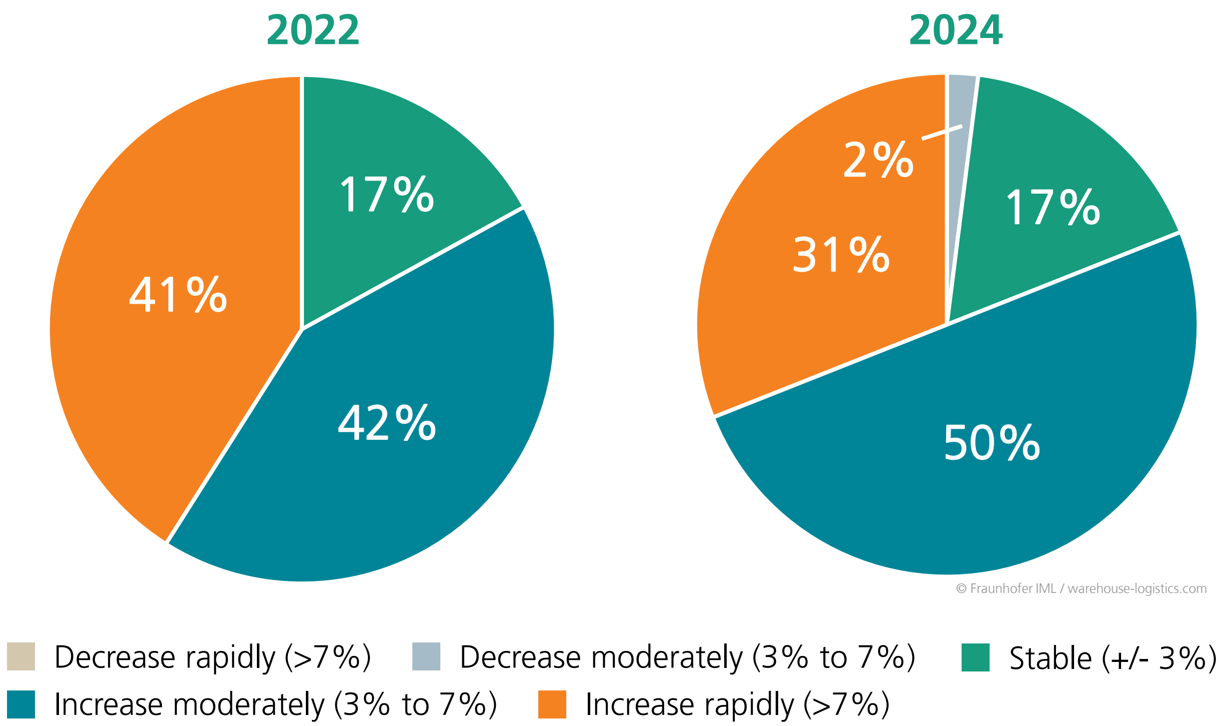


Almost two thirds of WMS providers have been offering their system for over 20 years. Almost 40% have been on the market for more than 30 years and, thanks to their many years of experience, have strong market stability and extensive industry knowledge.The majority of WMS providers state that employees have been with the company for an average of 6-9 years.

The given data is based on the statements of the WMS providers.

Employee Development in the WMS Sector

Estimation of the WMS Providers regarding the Annual Development of their Headcount in the WMS Sector



Actual Development of the Average Number of Employees from 2013 to 2021

7%

Employee Growth per Year

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The given data is based on the statements of the WMS providers.
The data for 2022 is taken from the WMS Market Report Compact 2022.

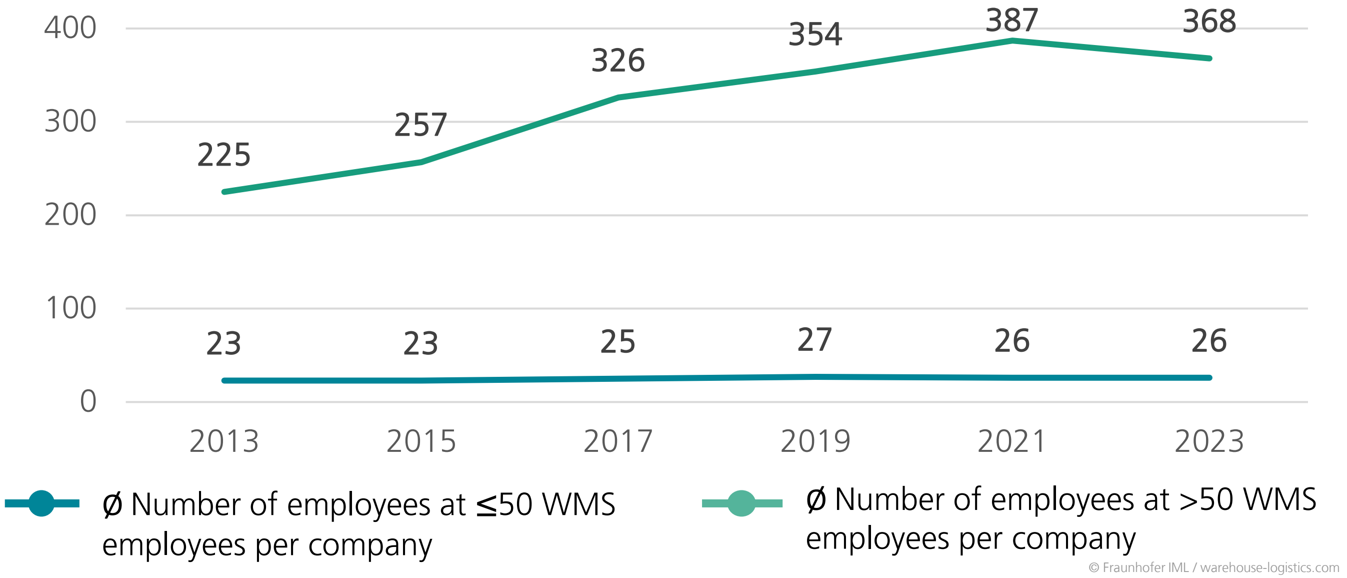
Employee Development in the WMS Sector

Development of Employee Numbers from 2013 to 2024

Distribution of the Number of Employees in the WMS Sector per Company

25%	< 25	employees
27%	25-49	employees
16%	50-100	employees
32%	> 100	employees

Development of the Average Number of Employees from 2013 to 2023 in the WMS Sector per Company



The average number of WMS employees is categorized by company size, distinguishing between large companies (over 50 employees) and small companies (under 50 employees). The distribution of companies in these two categories is nearly balanced. However, the development of employee numbers is not uniform: while smaller companies maintain a constant number of employees, larger companies have shown overall growth in recent years, despite a slight decline in 2023.

The given data is based on the statements of the WMS providers.
The data for 2013, 2015, 2017 and 2019 is taken from the WMS Market Report Compact 2020.

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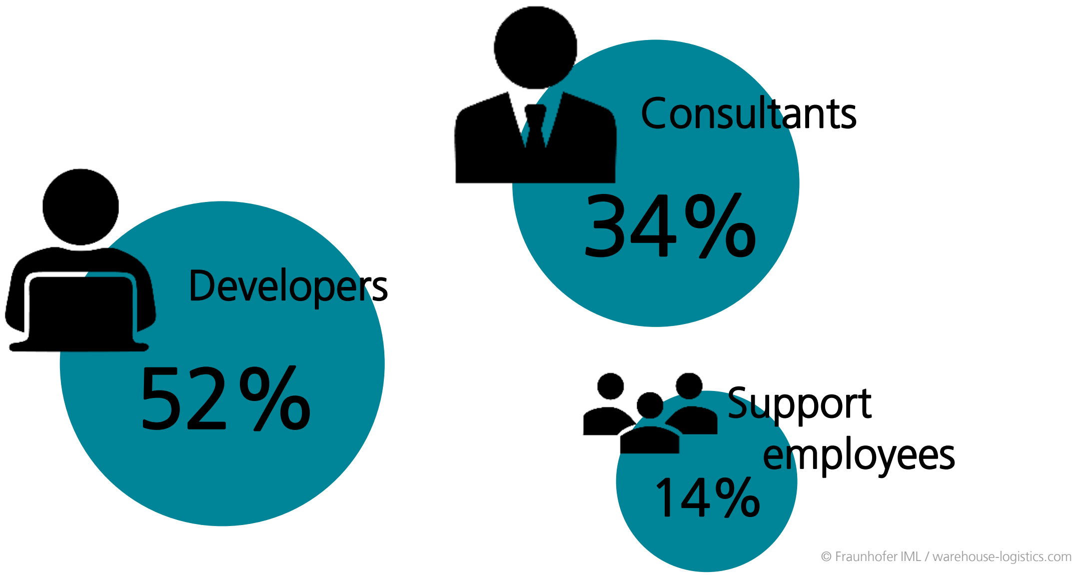
Employee Structures in the WMS Sector

Distribution of Employees by Type of Activity



Difficulties in Recruiting Skilled Workers

1. (Industry) experience of the applicants
2. Professional aptitude of the applicants
3. Qualification level of applicants
4. Competition between providers
5. Shortage of skilled workers

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A successful logistics IT project requires both comprehensive logistics and IT expertise on the part of the WMS provider. It is crucial that the customer's process-related requirements are supported by a suitable IT solution. 34% of staff are consultants who, as logistics and process experts, are increasingly responsible for customer-specific parameterization and system configuration. The proportion of developers has risen by 9% since 2020, meaning that more than half of employees now work as developers.

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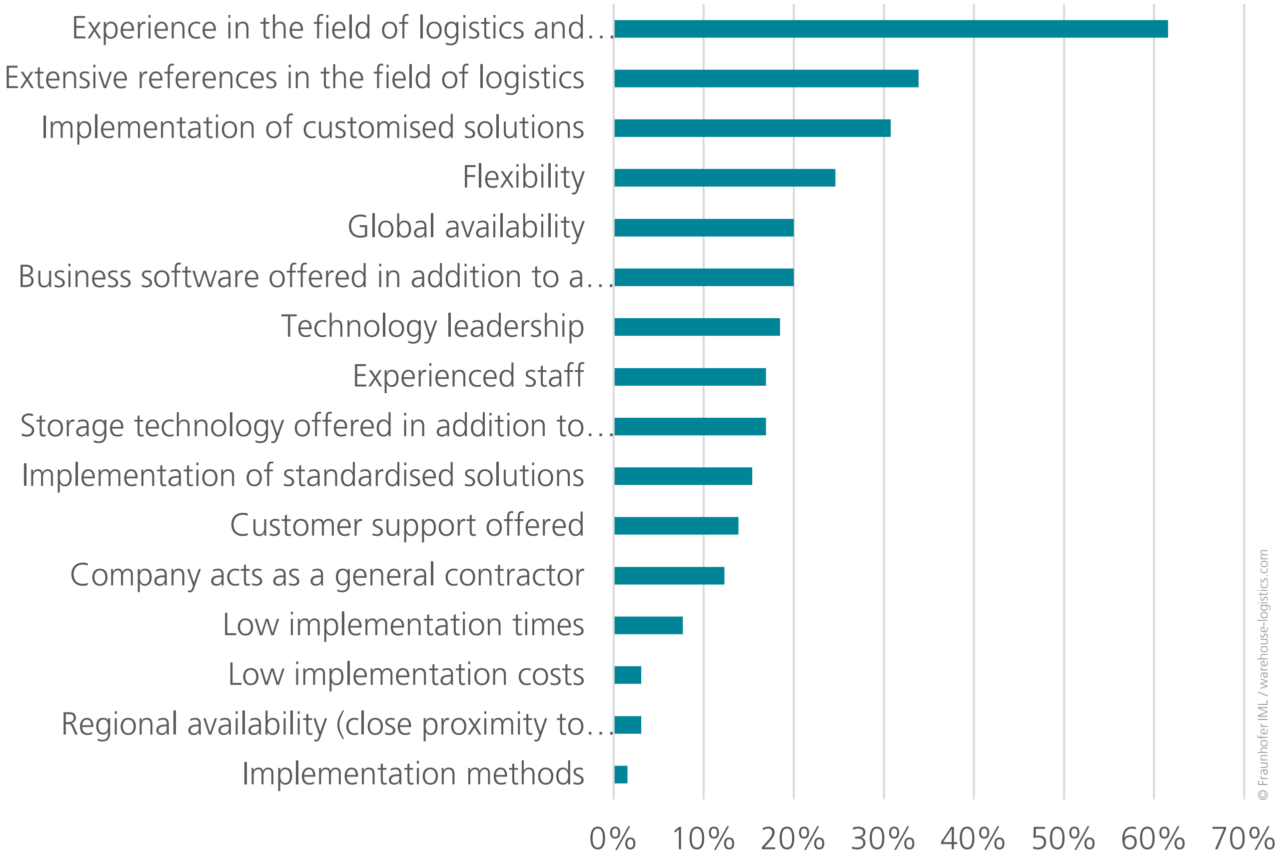
Success Factors of WMS Providers



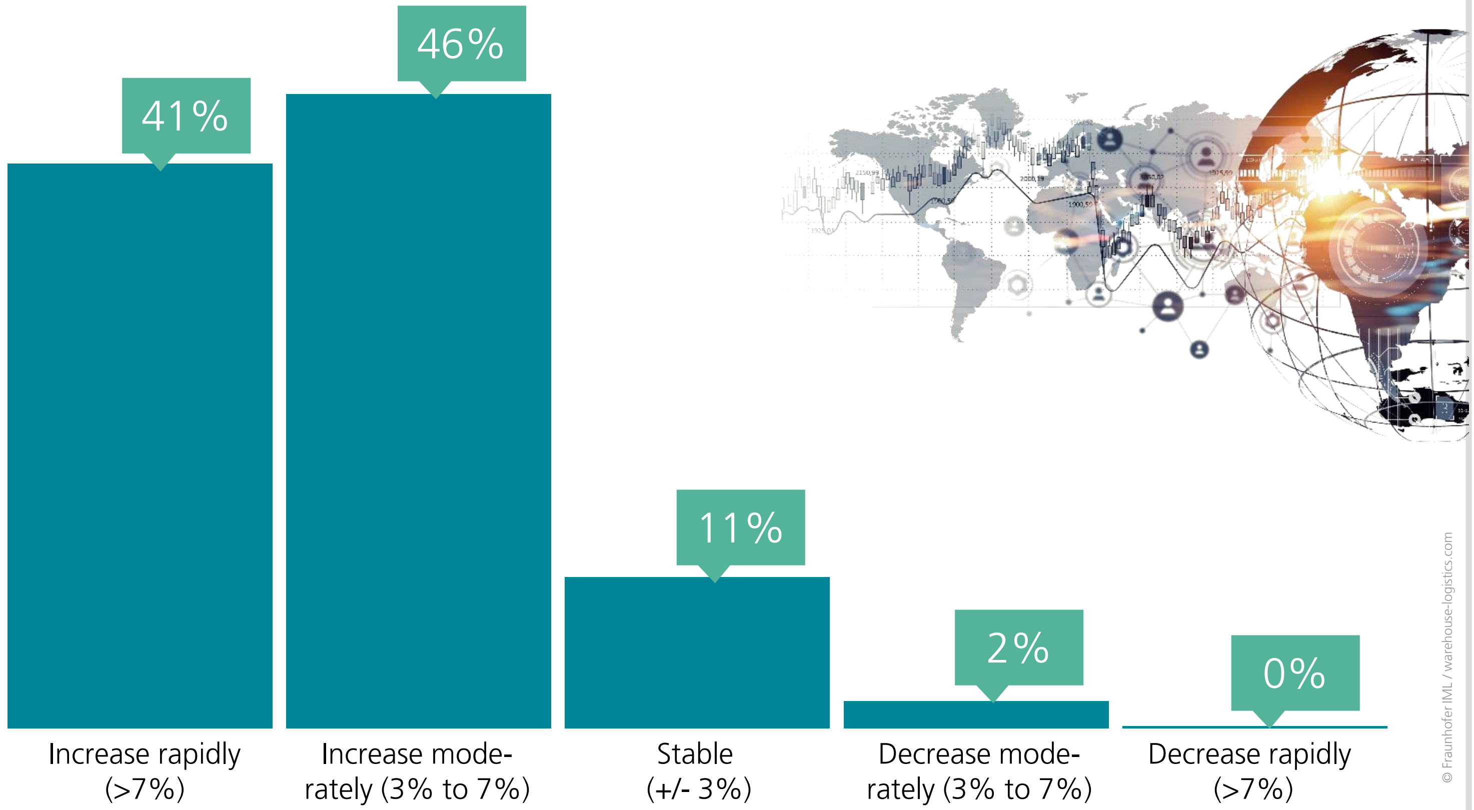
Top 5 Success Factors of the WMS Providers

62%	Experience in logistics and processes
34%	Extensive references in logistics
31%	Implementation of customised solutions
25%	Flexibility
20%	Global availability

The successful positioning of WMS providers on the market is largely based on their comprehensive logistics and process expertise. This success factor is supported by numerous references in logistics and the ability to implement customized solutions. These aspects have proven to be decisive for success in the industry over the years.

Development of Turnover in the WMS Sector

Estimation of the Annual Turnover Development for the Years 2024-2028



Average Annual Turnover Increase from 2015 to 2024

13,5%

Almost 60% of WMS providers forecasted a slight increase in revenue for 2020, which was confirmed at 4.6%. This year's forecast is somewhat more pessimistic compared to 2022. In 2022, 54% of providers still anticipated a slight increase in revenue. This figure has decreased slightly, as more providers now expect revenue to remain stable. Only 2% are predicting a decline in revenue.

The given data is based on the statements of the WMS providers.
The data for 2015-2022 is taken from the WMS Market Report Compact 2022.

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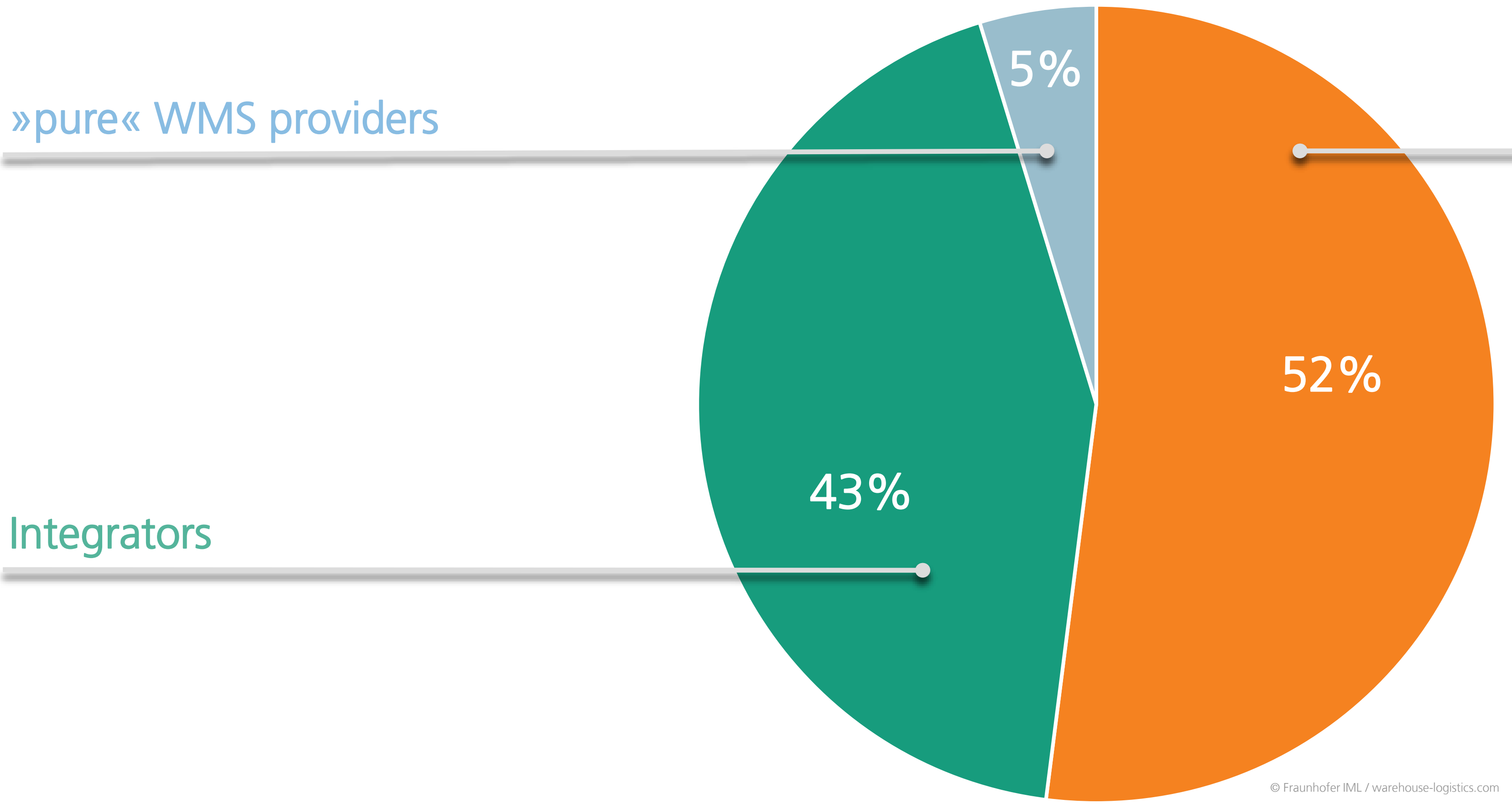
Share of Turnover by Type of WMS Provider

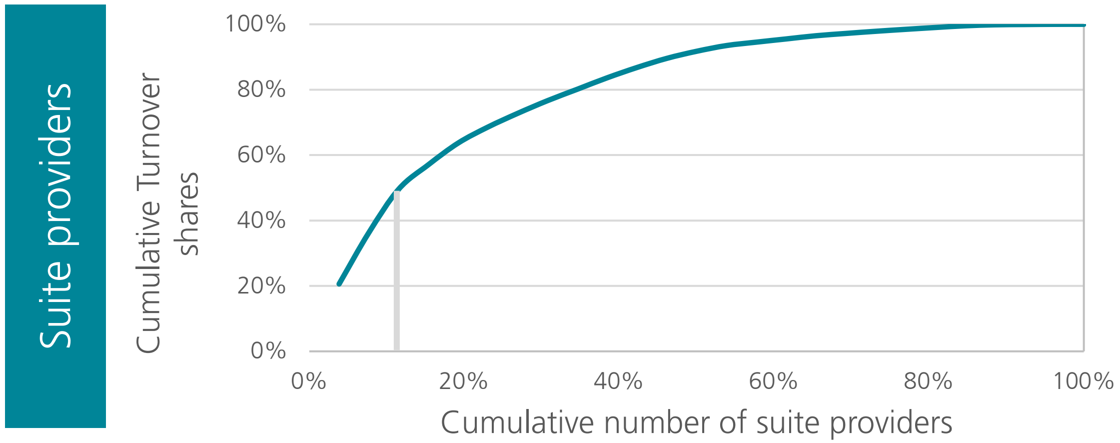
Division of the Total Annual Turnover 2021 in the WMS Sector

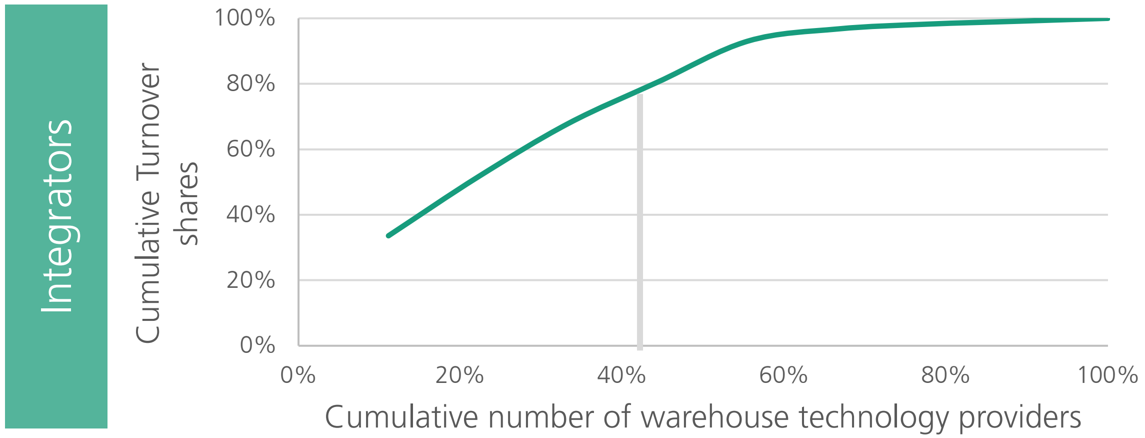


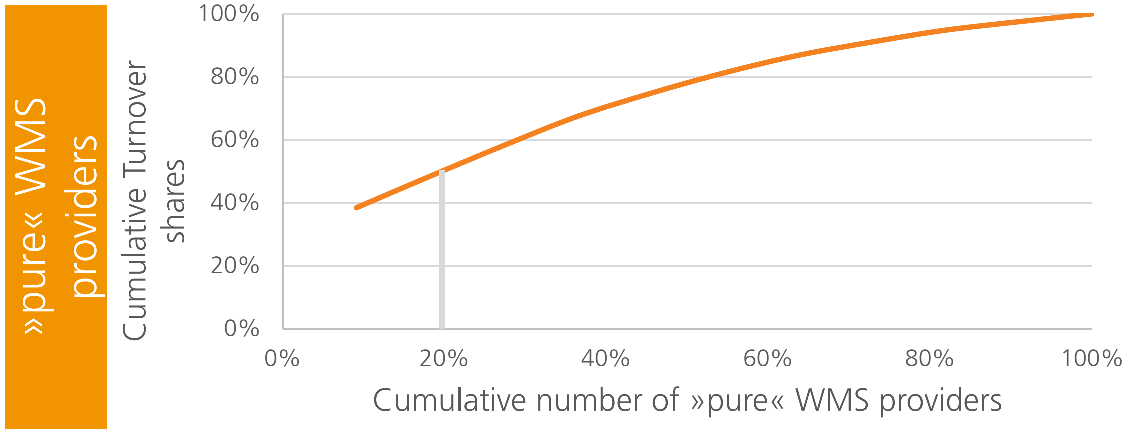
Of the 65 providers, 47 provided information on their own classification into provider types. Compared to 2021, the revenue share of suite providers has increased by 3%. The average turnover of a suite provider in the WMS sector will be just under 11 million euros in 2023. The "pure" WMS providers, which focus on the implementation of WMS, achieved an average turnover of around 2.36 million euros per provider in the WMS sector. The turnover share of warehouse technology providers is 43% and is therefore 5% lower than in 2021. In 2023, warehouse technology providers generated an average of EUR 26.4 million in the WMS sector.

Cumulative Share of Turnover per Provider Type

Sales Shares in the Market Segments of the Respective Provider Types







In the suite provider segment, the top 12% of providers generate 50% of cumulative revenue. Thereafter, it can be seen that the turnover of the following providers increases less steeply. The leading providers in this segment have a significant market share position, while the sales development of the following providers is slower. In the case of the warehouse technology providers that achieve a higher overall turnover through the sale of warehouse technology, it can be seen that around 45% of these providers account for more than 80% of cumulative turnover. This indicates a strong concentration within this market group. Among the providers, the »pure« WMS providers tend to generate lower sales due to their portfolio of offerings. However, 20% of providers generate 50% of total sales.

The given data is based on the statements of the WMS providers.

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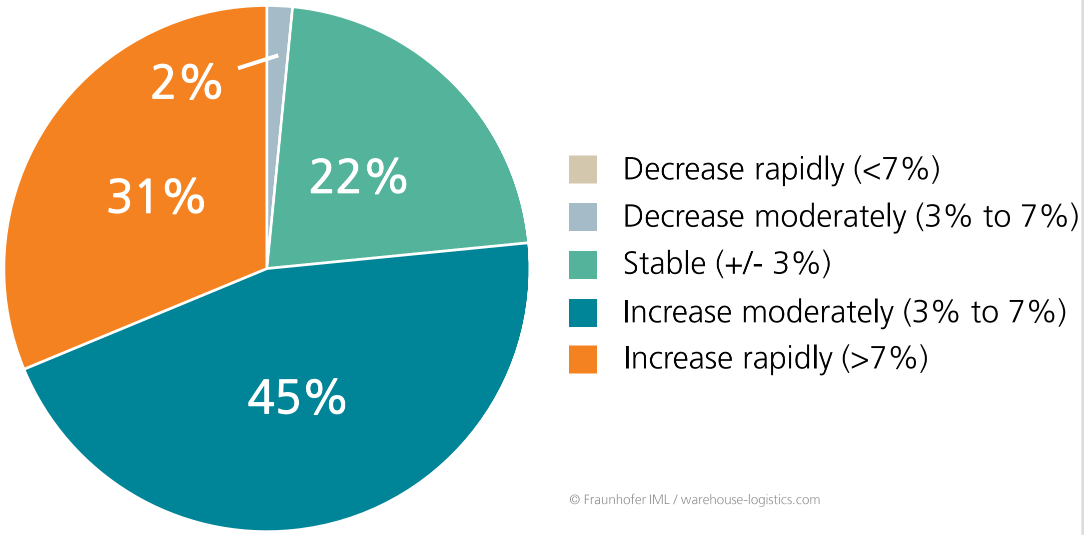
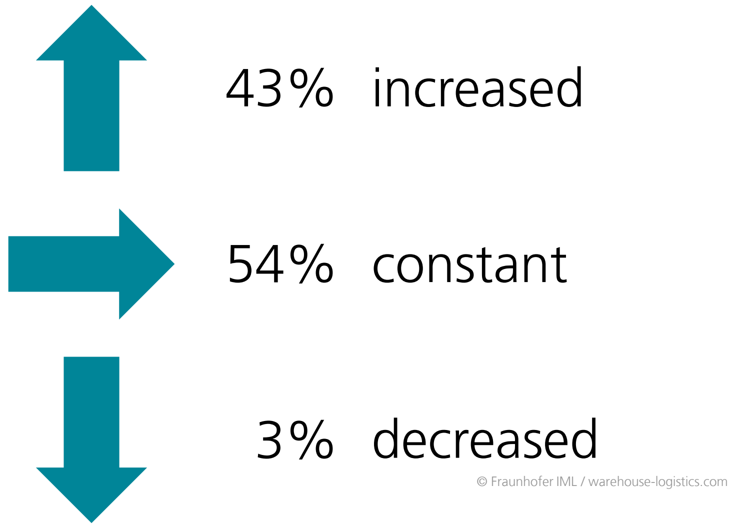
Development of Market Volume and Competitive Pressure

Expected Annual Development of the WMS Market Volume in the Upcoming 4 Years



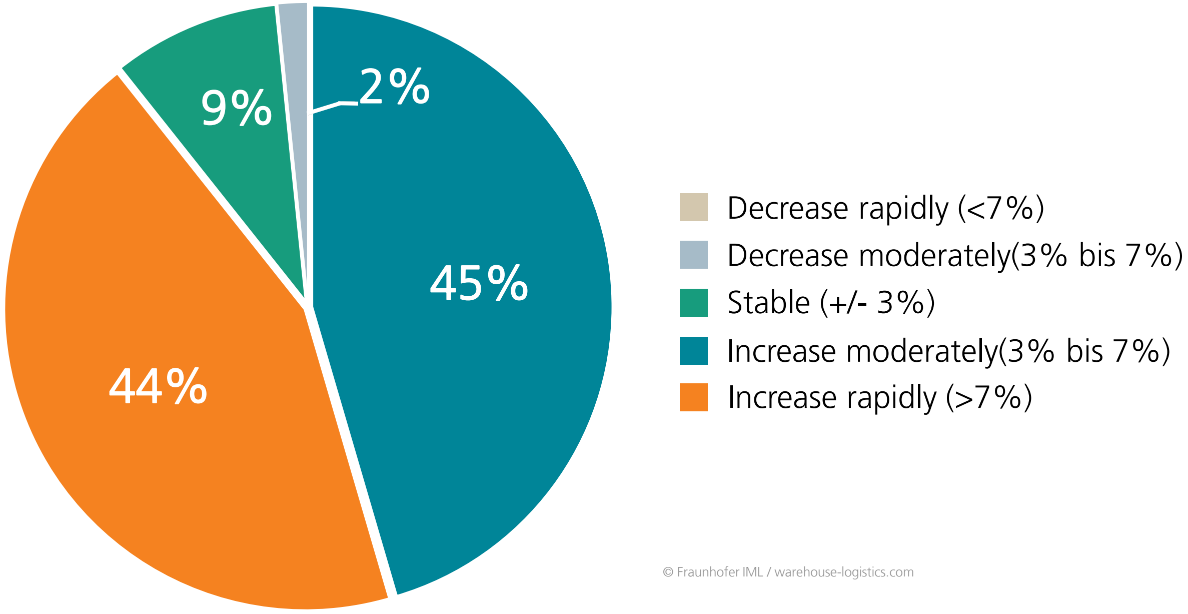
Expected Development of the Competitive Pressure in the past 3 Years



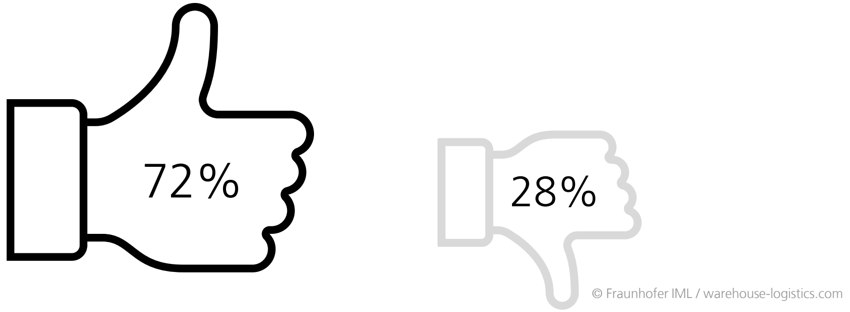
Despite increasing market volume, half of the WMS providers feel that competitive pressure in the industry is increasing. Only 3% of WMS providers believe that past competitive pressure is decreasing. A decrease in market volume is expected by 2%.

Developments of Cloud Solutions in the WMS Market

Expected annual Development of the WMS Market Volume of Cloud-based Systems in the next 4 Years



Active Marketing of WMS Cloud Solution

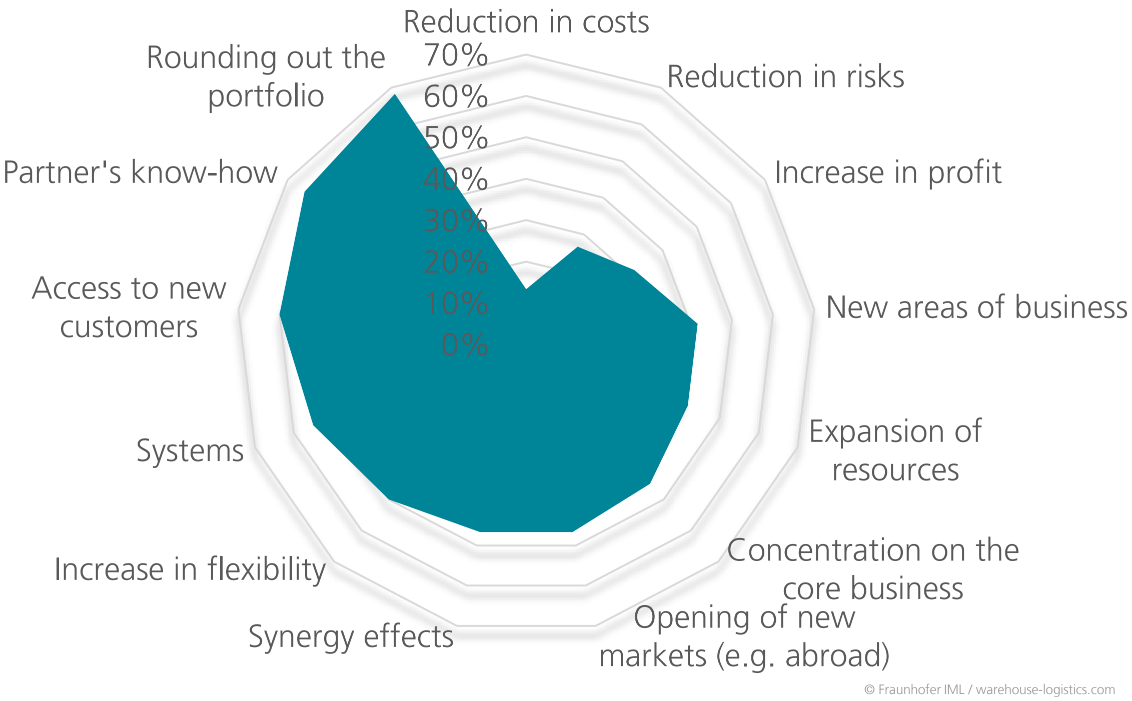


The active marketing of WMS Cloud solutions is declining compared to 2022. While the marketing rate was 80% two years ago, it is now only 72%. Despite this decline, 89% of providers expect the WMS market volume for cloud-based systems to develop positively over the next four years.

The given data is based on the statements of the WMS providers offering a validated cloud solution.

Partnerships of WMS Providers

Benefits for the Providers through Partnerships



Partnerships of the Providers in the WMS Sector

87%
Sales partnerships

83%
Technology and development partnerships

67%
Implementation partnerships

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With a share of 87%, the sales partnership is the most common partnership in the WMS sector. In this context, the expansion of the portfolio, the partners' expertise and access to new customers play a decisive role.

The given data is based on the statements of the WMS providers.

Internationalisation

Reasons for Expansion and Future Establishment of international Branches

1. Strategic expansion
2. Growth market
3. Proximity to customers for service and support
4. Existing customers are located in the country and are planning new investments in WMS
5. Existing customers plan to expand to those countries

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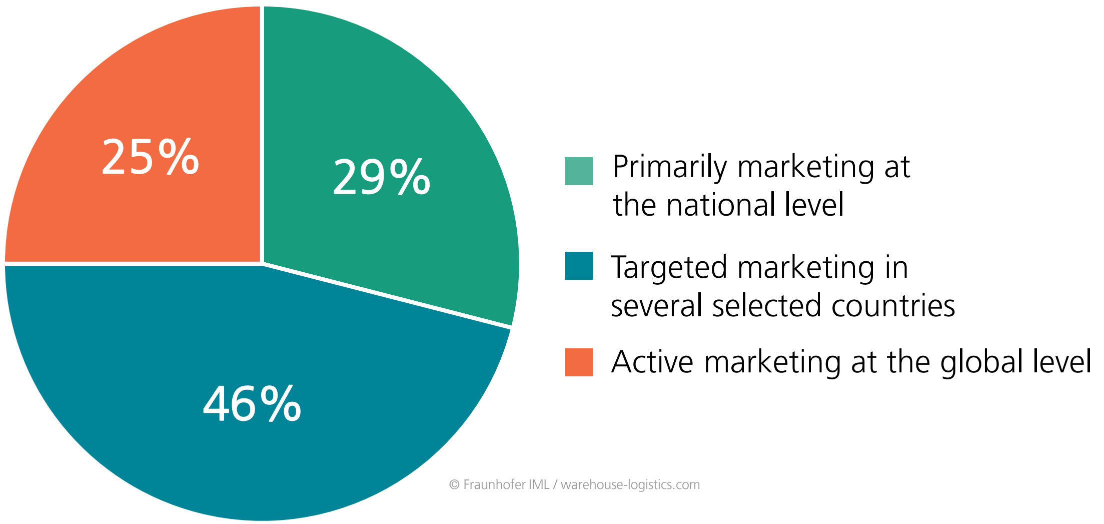
Strategies with regard to Marketing and Internationalisation



The number of WMS customers operating globally continues to rise. In order to gain a foothold in other countries, it is helpful to find a partner who knows the local conditions and can therefore lower the barriers to entry in the respective country.

Top 5 Growth Factors for the WMS Market

1. Mechanisation and automation in the companies — 65%
2. Increasing demand for information transparency — 46%
3. Providing information to the customer on the cost effectiveness of a WMS — 42%
4. Increasing personnel costs in the warehouse — 42%
5. Standardisation and harmonisation of the IT platforms — 29%

The given data is based on the statements of the WMS providers.

Development Trends in the WMS Market

Consideration of the Upcoming 4 Years

Artificial Intelligence

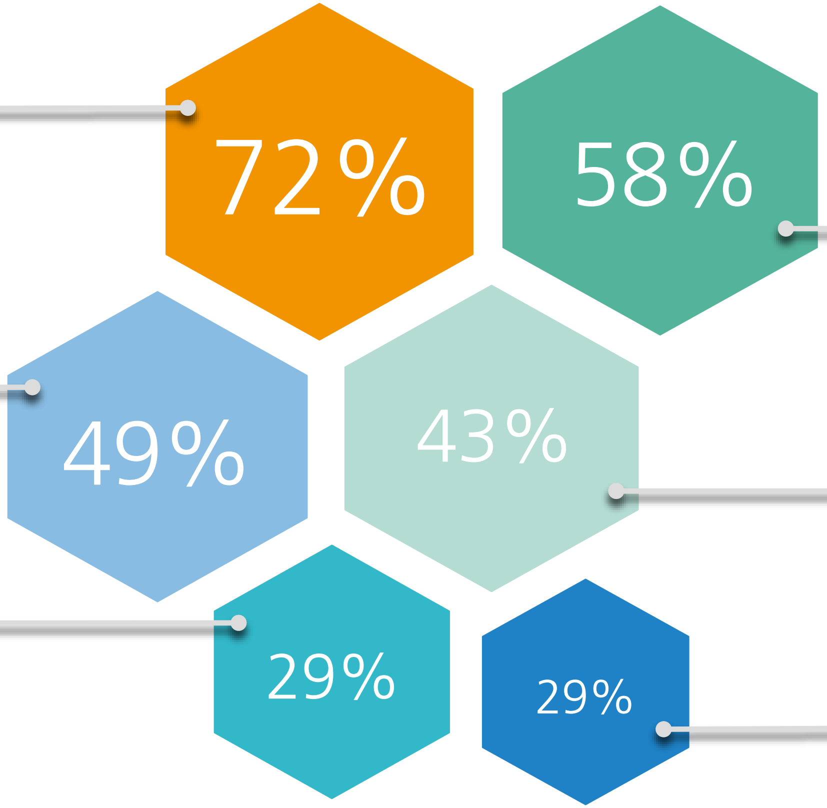
Cloud-based and
cloud-native IT landscapes

Flexibility in the ordering
and receiving process

Industry 4.0 / Logistics
4.0 / Internet of Things

Increasing implementation of
End-to-End customer process solutions

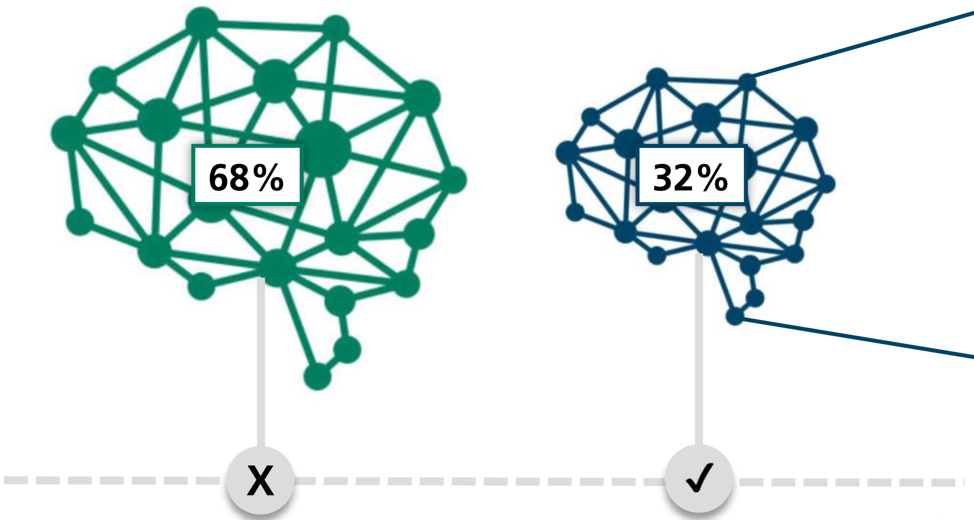
Conscious End-Customer



The given data is based on the statements of the WMS providers.

Use and approaches of AI on the WMS market

Proportion of WMS providers that use AI in the system



N = 57 WMS provider

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Approaches used

44%	Personnel requirement forecast
39%	Order forecast
39%	Fleet management

N = 18 WMS-provider

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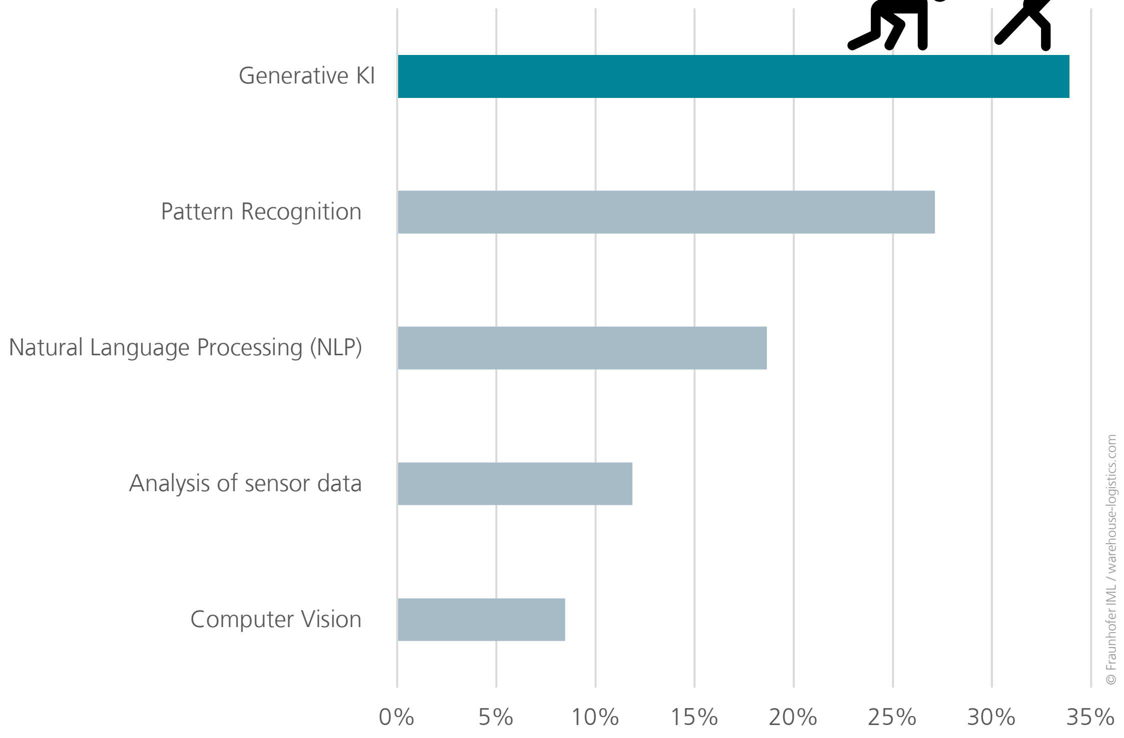
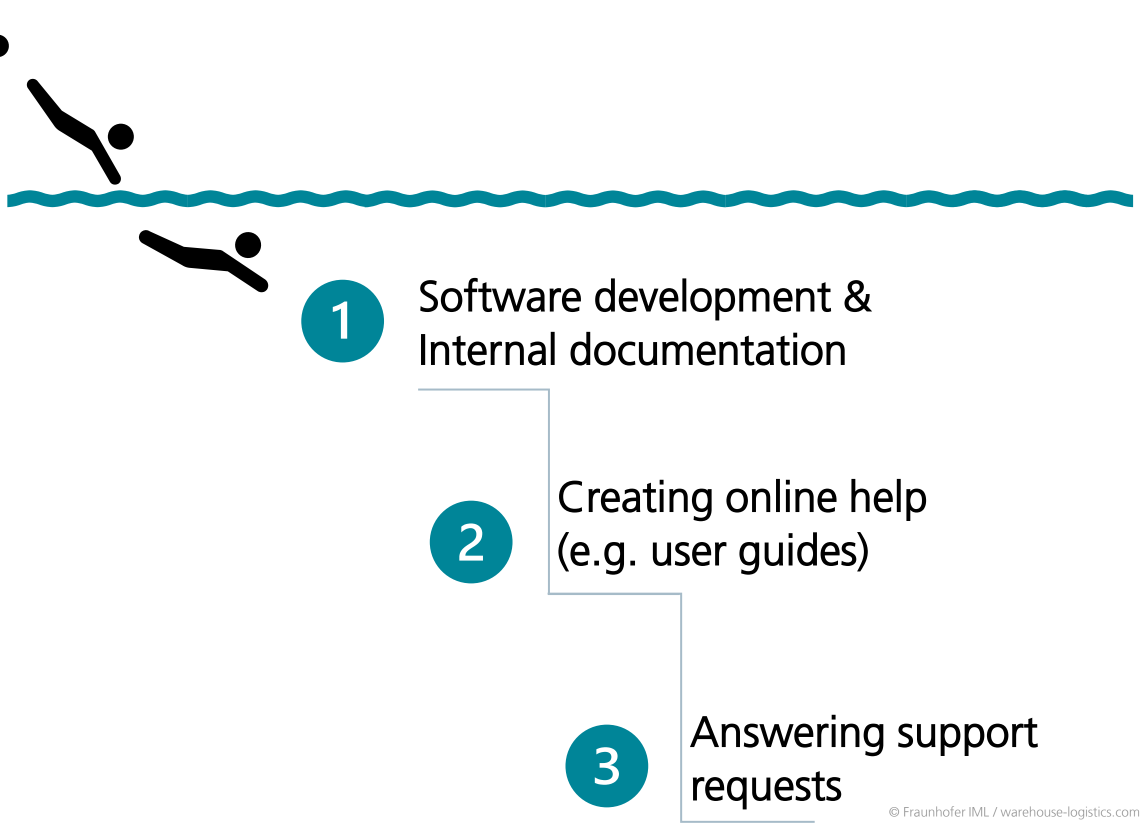
AI approaches in the WMS market

Artificial intelligence approaches used in the context of WMS



Deep Dive Generative AI



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Functionalities of AI in the WMS market

Top 4 functionalities where AI is used

- 23% Fleet management
- 23% Personnel requirement forecast
- 19% Slotting and warehouse reorganisation
- 19% Volume utilisation in transport space

Functionalities for which the use of AI is planned for the next 2 years

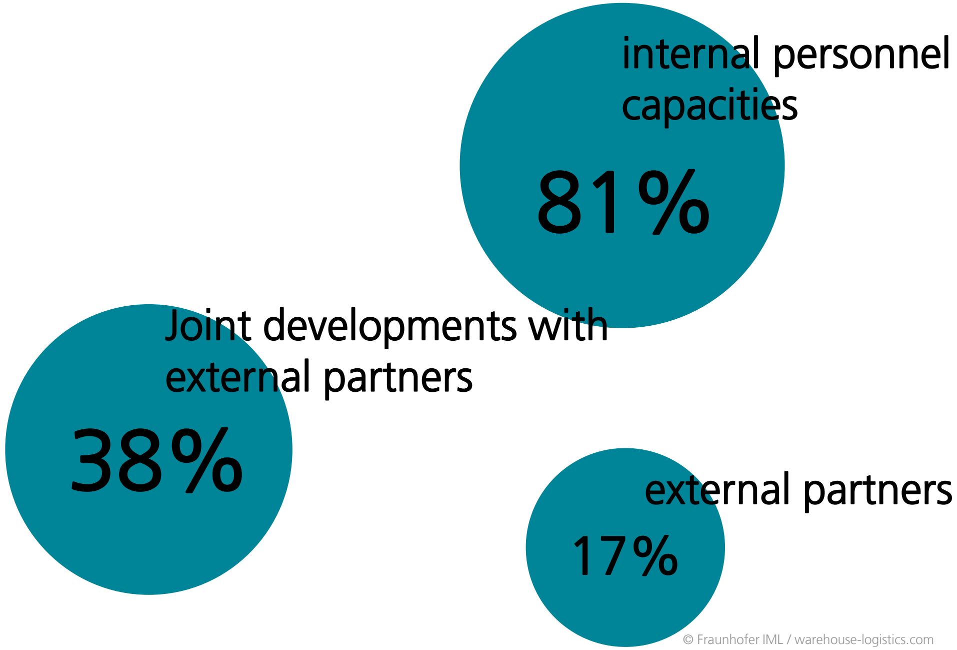
- 16% Personnel requirement forecast
- 12% Batch formation
- 12% Storage location allocation
- 12% Replenishment control

The given data is based on the statements of the WMS providers.

Use of Artificial Intelligence

Those responsible for implementation and challenges

Responsible for the implementation of developments with AI



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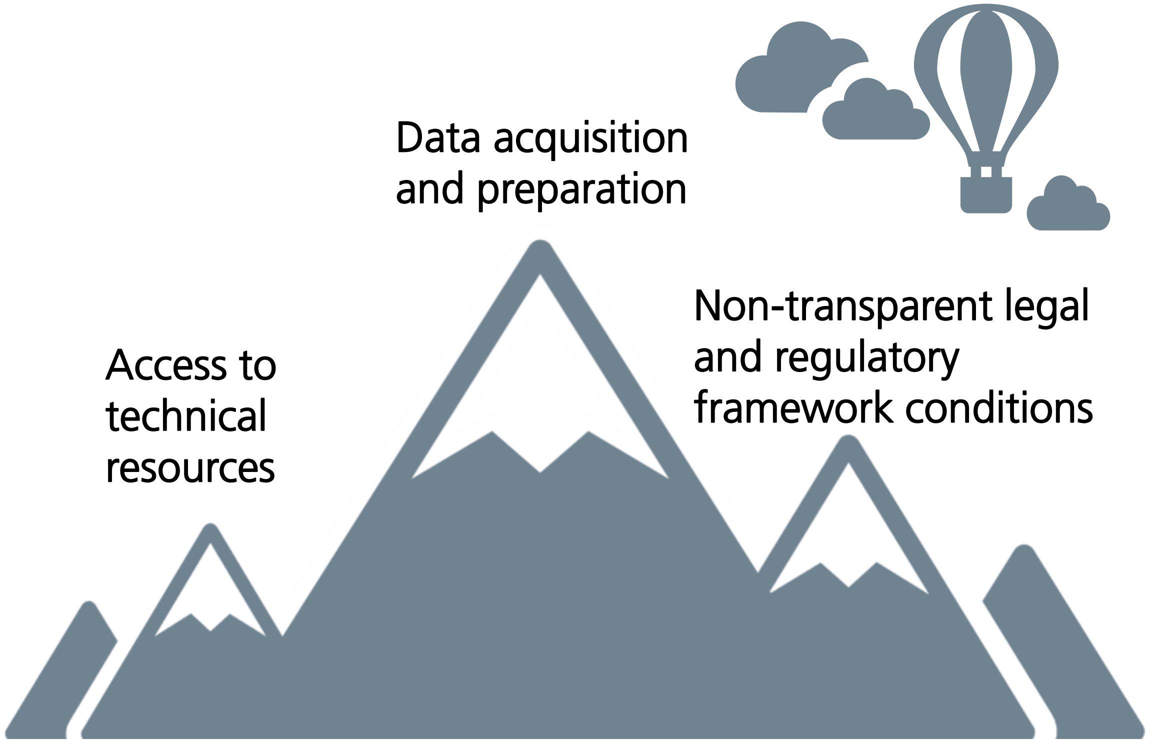
Top challenges in the development and use of AI



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Conclusion »The WMS Market«

Provider types

The share of suite providers continues to grow, with more than half of WMS providers now identifying as suite providers and focusing on expanding their product portfolio with complementary logistics IT systems. The remaining providers are equally divided between suite providers and 'pure' WMS providers.

Employees

In smaller companies, the number of employees in the WMS sector remains constant, while it has overall increased in medium-sized and large companies over the past years, despite a slight decline in 2023.

More than half of the employees are developers, complemented by consultants and support staff. Consultants bring process, logistics, and project management expertise.

Growth factors

Mechanization and automation are still seen as important growth drivers in the WMS industry.

Since 2020, personnel costs in warehouses have risen significantly and are seen as one of the defining trends of the coming years.

Expertise

For most WMS providers, logistics and process expertise proves to be the most important success factor.

Almost two thirds of providers have been on the market for over 20 years and use this experience to expand functionalities and develop supplementary IT systems.

THE STANDARD WMS

Definition · Plane Model of System Landscape · Functional Scope · Popular Functionalities · Development Focus · Types of Information Provision · Connection Types of Solutions · Budget · Software · Licensing Models · Strenghts of WMS

Definition and Demarcation

Warehouse Management System (WMS)

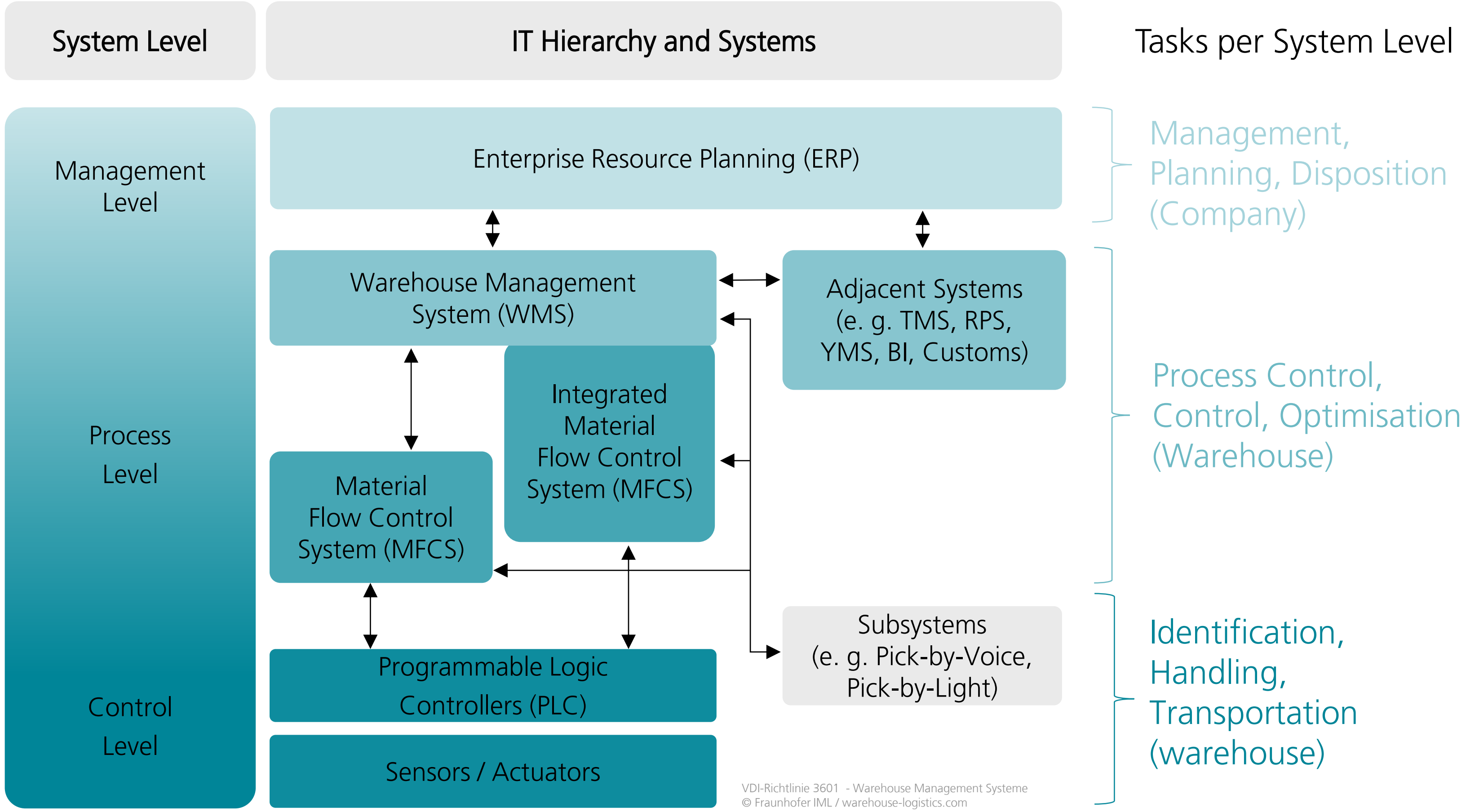
Warehouse management is the general term for the management, control and optimisation of storage and distribution systems. In addition to the elementary functions of a warehouse management system, which include quantity and storage location management as well as conveyor control and disposition, the scope of services of a warehouse management system includes

- methods and means for controlling system statuses and
- a selection of operating and optimisation strategies.

The task of a WMS is to manage and optimise intra-company storage systems.

Definition according to VDI guideline 3601 - Warehouse Management Systems (2015).

Plane Model of System Landscape



As part of the corporate system landscape, the WMS communicates with adjacent systems via interfaces (cf. plane model according to VDI Guideline 3601).

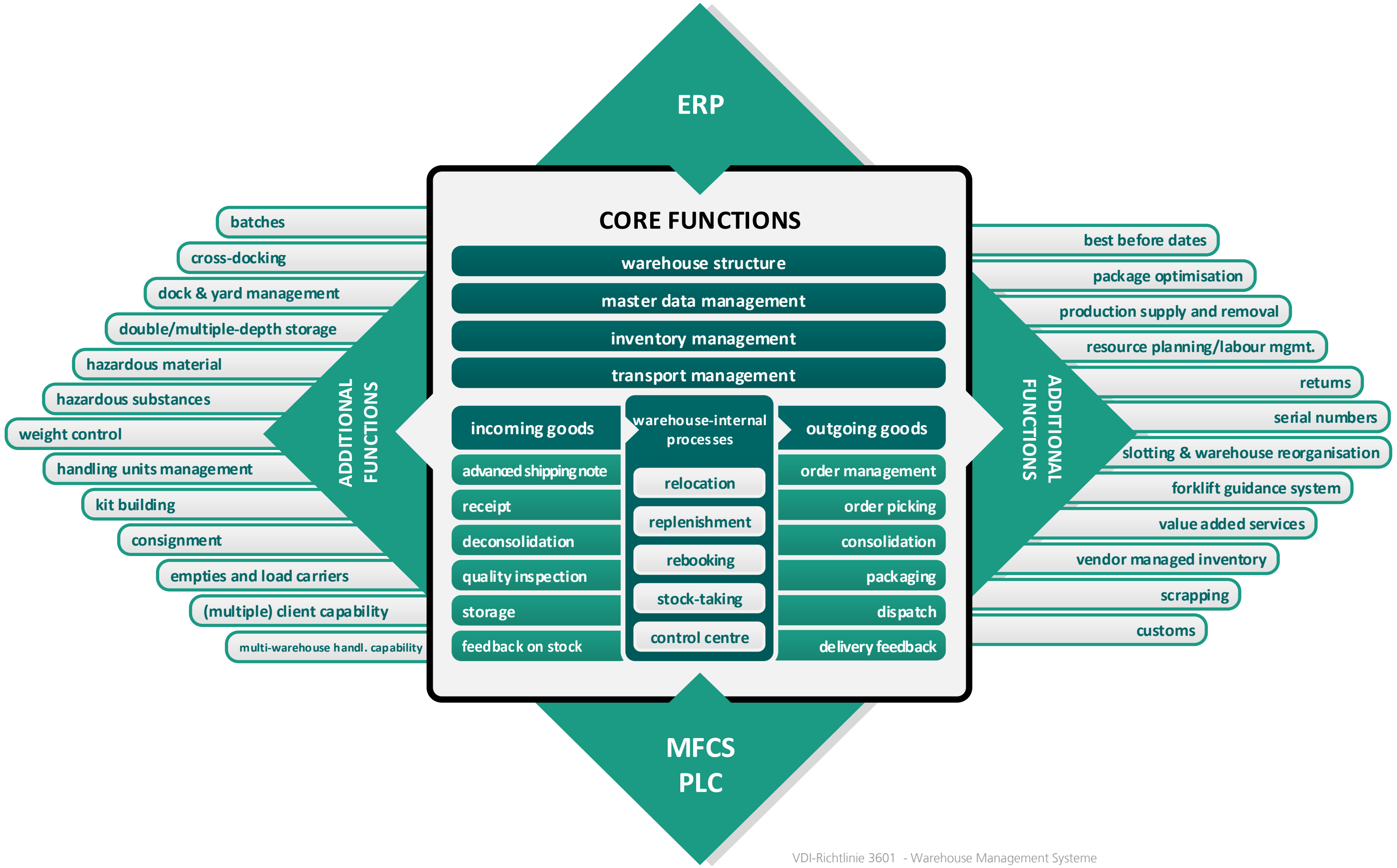
The management level includes among others finance and accounting, human resources, master data and inventory management.

The process level deals with the warehouse structure, the internal transport management and the support of the processes from incoming goods to outgoing goods. Master data and inventory management is limited to the intralogistics area.

The control level deals with data acquisition and transfer as well as the execution of material movements.

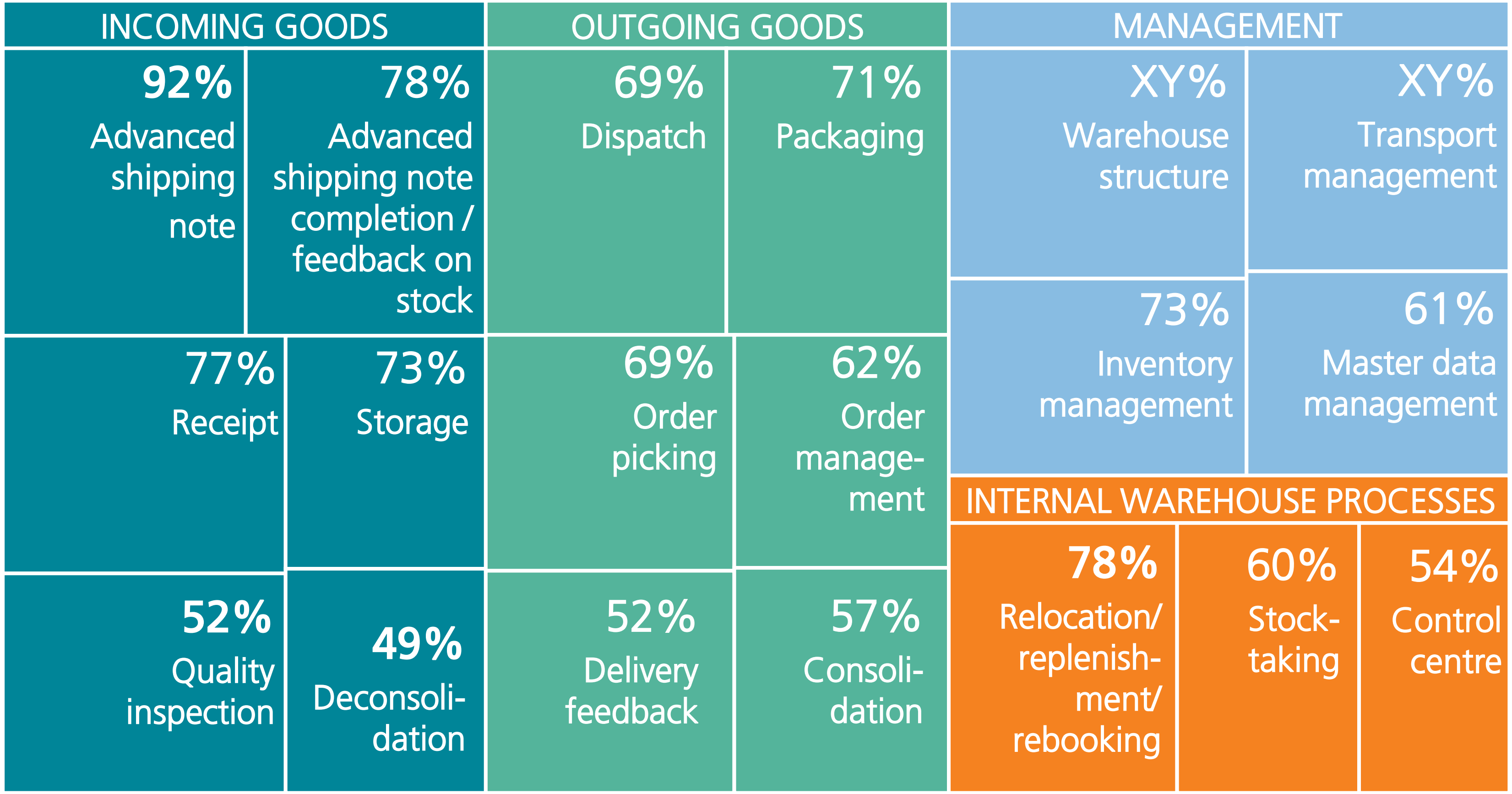
Functional Scope of a WMS

Core and Additional Functions



Core Functions of a WMS

Average Degree of Functional Performance of the Listed Systems



Top 4 developments compared to 2022

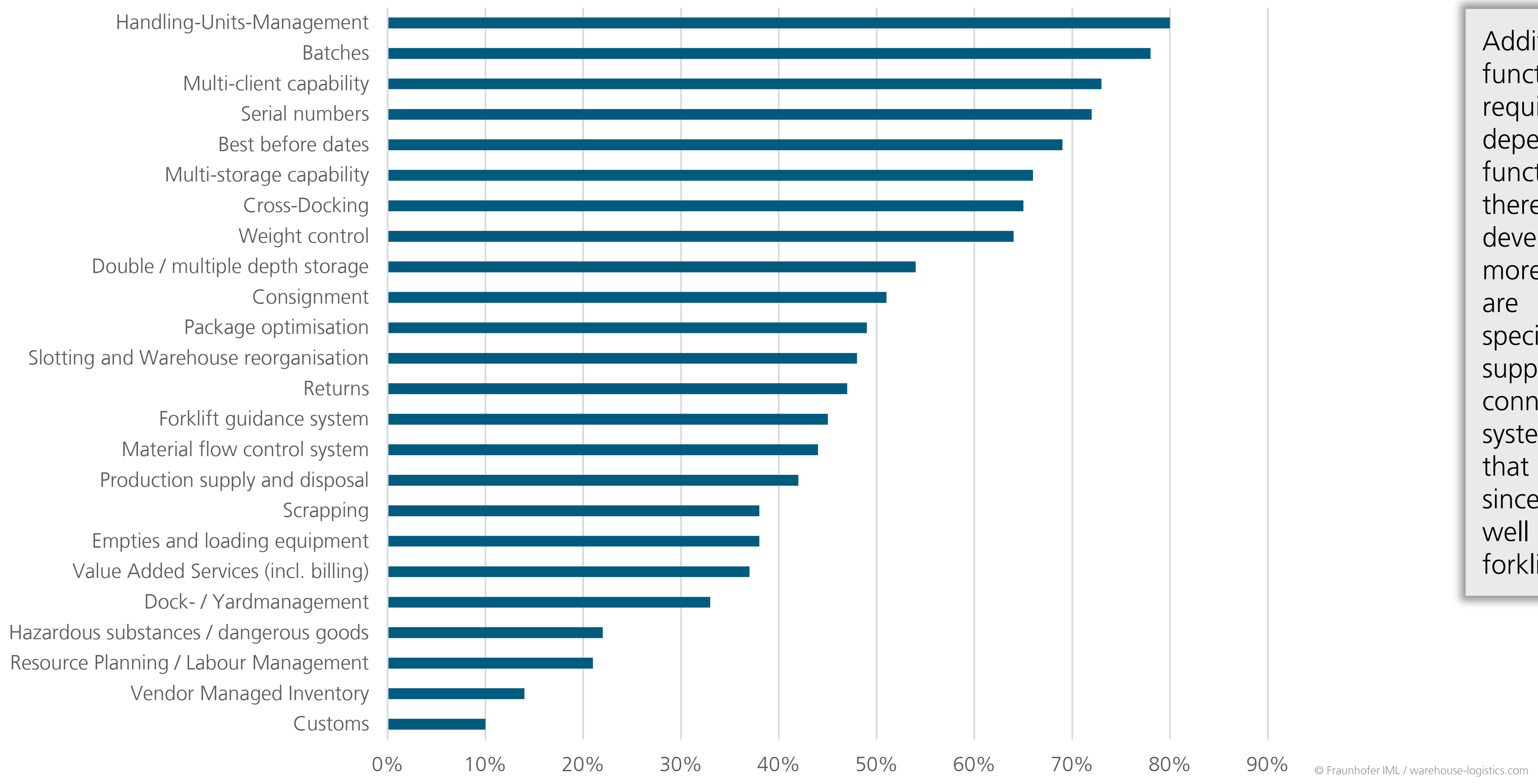
+11%	Delivery feedback
+ 2%	Deconsolidation
+ 2%	Warehouse structure
+ 1%	Transport management

Data for 2022 is taken from the WMS Market Report Compact 2022

The data has been determined using the »Logistics IT Online Selection«, which is based on the validated values of 2024

Additional Functions of a WMS

Average Degree of Functional Performance of the Listed Systems



Additional functions supplement the core functions depending on individual process requirements and can vary in detail depending on the WMS. Some additional functions are in demand and have therefore already been extensively developed by WMS providers. However, if more extensive expertise or functionalities are required, it is advisable to consider specialized logistics IT systems as a supplement to the WMS, which are connected via an interface within the IT system landscape. Additional functions that have become particularly relevant since 2022 are consignment with +4%, as well as double/multi-deep storage and forklift guidance systems with +3%.

The data for 2022 is taken from the WMS Market Report Compact 2022.
The data has been determined using the »Logistics IT Online Selection«, which is based on the validated values of 2024.

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Benchmarking Supply and Demand

Top 5 of the most Requested K.O. Criteria from the »Logistics IT Online Selection« in the WMS system group

Necessary Criteria as Specified by WMS Users1		Ø Degrees of Fulfilment of the Criteria by the WMS²
31%	Batch management	78%
28%	Multi-warehouse handling capability	66%
26%	Management of best before dates	69%
23%	Serial numbers management	72%
23%	(Multiple) client capability	73%

The overview lists the K.O. criteria most frequently selected by WMS users in the »Logistics IT online selection« and compares this information with the functional fulfillment levels of the listed WMS. Compared to 2022, these are still the same five most popular K.O. criteria with different levels of demand.

1 The given data is based on the information of 249 WMS users of the »Logistics IT Online Selection«.

2 The data has been determined using the »Logistics IT Online Selection«, which is based on the validated values of 2024.

Benchmarking Supply and Demand

Top Values when Using the »Logistics-IT Online Selection« in the WMS system group

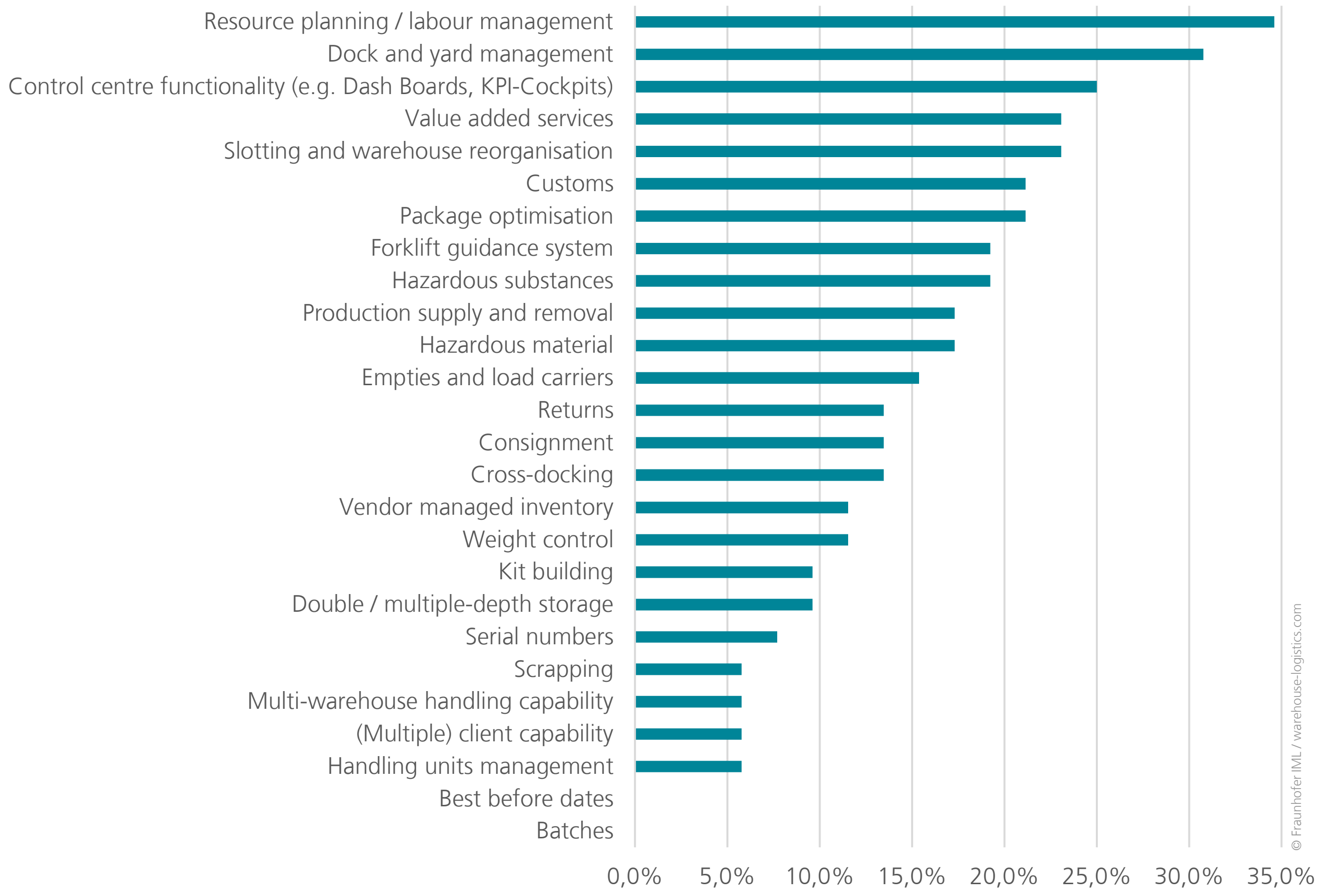
	Fulfilment by Validated Systems[1]	Selection through WMS Users[2]
Mapping of a Batch Management Batch management was cited by 27% of WMS users as a knock-out criterion in the »Logistics IT Online Selection«. Batch management is primarily concerned with the legally prescribed traceability of batches that separate stocks. The level of batch management can vary between WMS providers.	98%	Top Value 27%
Support of a Multi-storage Capability 24% of WMS providers consider multi-warehouse capability, already supported by 96% of WMS solutions, as a fundamental functionality. Multi-warehouse capability refers to a WMS's ability to support at least two spatially and organizationally separate warehouse locations. Key features include providing an inventory overview for each location, a consolidated view of total inventory across all locations, and enabling replenishment or consolidation between individual sites.	95%	Top Value 26%

1 The data has been determined using the »Logistics IT Online Selection«, which is based on the validated values of 2024.

2 The given data is based on the information of 249 WMS users of the »Logistics IT Online Selection«.

Functional Development Focus

Project Already Started or Concretely Planned for the Upcoming 4 Years



Percentage Change of the Top 3 Development Priorities since 2022

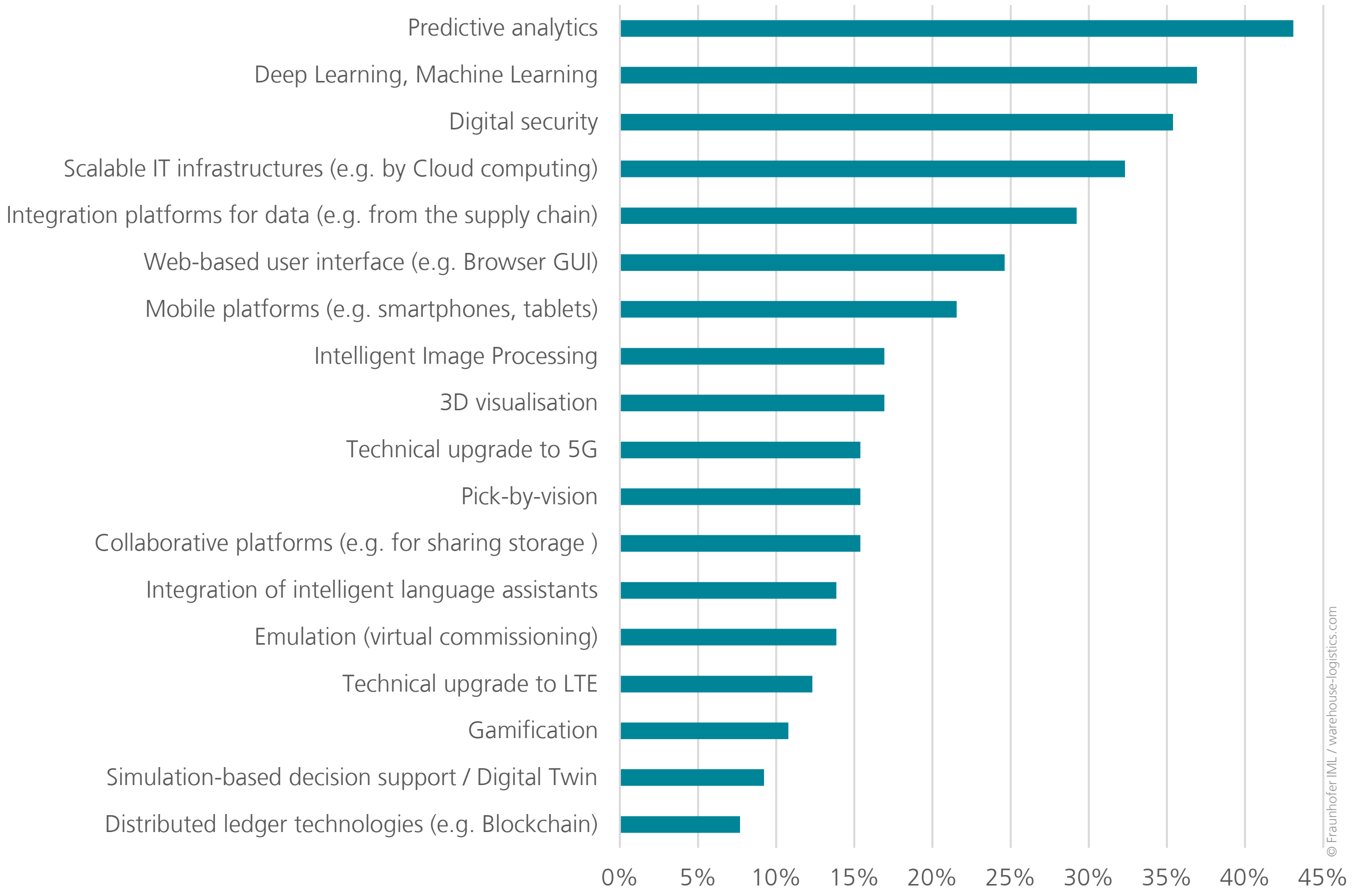
+6%	Resource planning / labour management
+10%	Dock and yard management
+6%	Control centre functionality

Resource planning and the control centre each have a percentage increase of 6% and therefore remain one of the most important success factors for WMS providers. In addition, dock/yard management has become more relevant in the last two years.

The given data is based on the statements of the WMS providers.
The comparative data for 2022 is taken from the WMS Market Report Compact 2022.

Technological Development Focus

Project Already Started or Concretely Planned for the Upcoming 4 Years



Percentage Change of the Top 3 Development Priorities since 2022

+6% Digital Security

+2% Deep Learning, Machine Learning

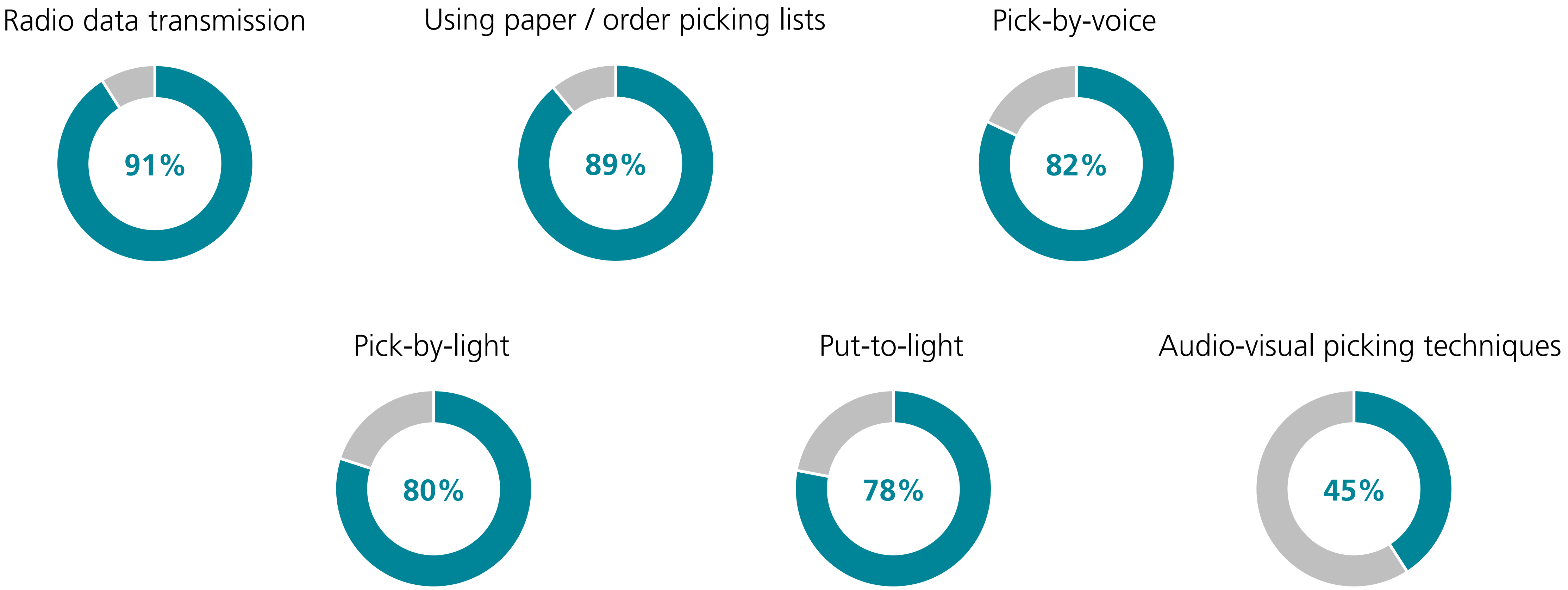
-3% Predictive Analytics

In the area of digital security as a development focus, there has been an increase of +6% since 2022 and shows that this is increasingly becoming the focus of WMS providers. In the WMS industry, the importance of deep learning and machine learning as part of artificial intelligence continues to grow. Predictive analytics was the top development focus in 2022, but has lost importance since then.

The given data is based on the statements of the WMS providers.
The comparative data for 2022 is taken from the WMS Market Report Compact 2022.

Types of order picking information

Supported types of information provision



The given data is based on the statements of the WMS providers.

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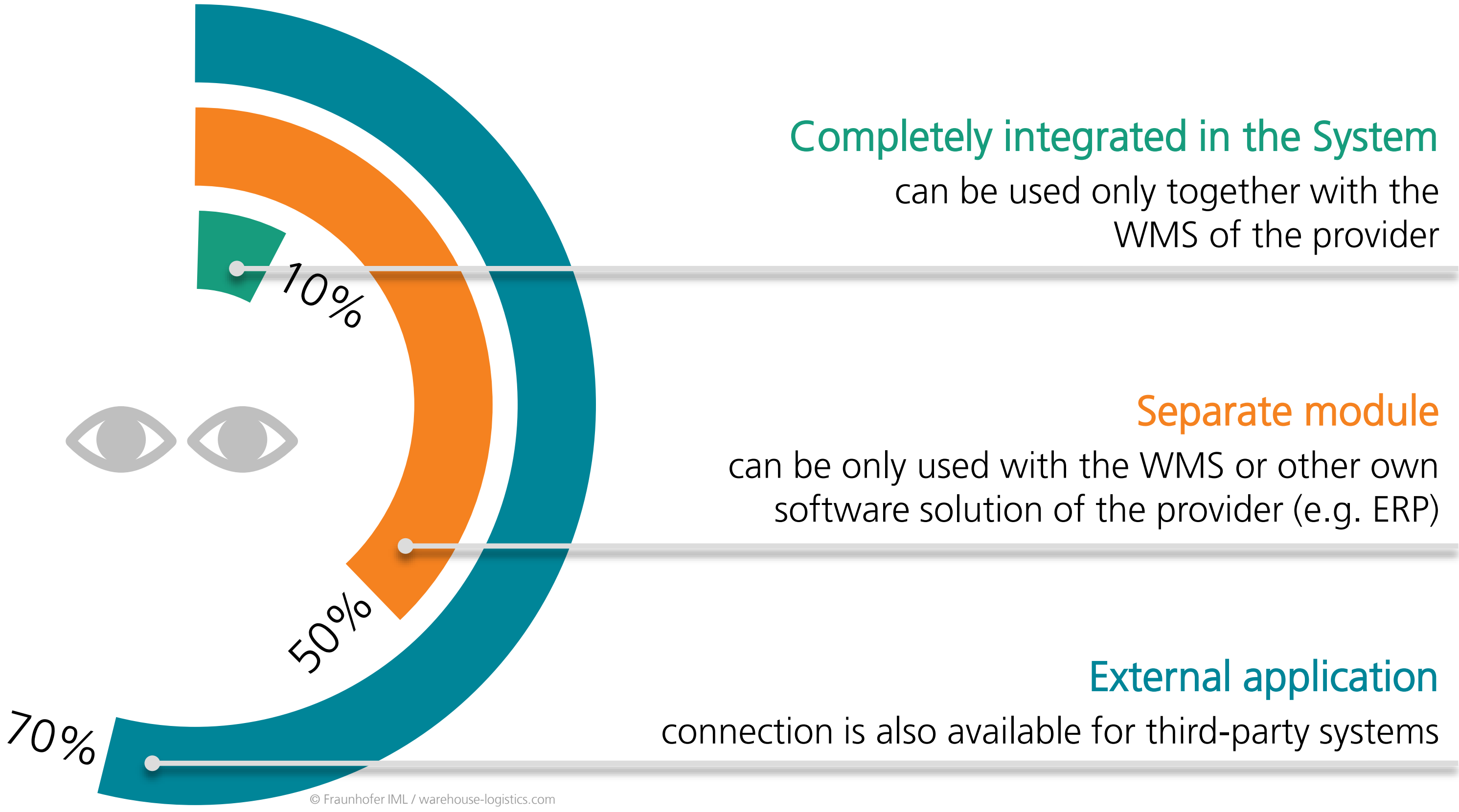
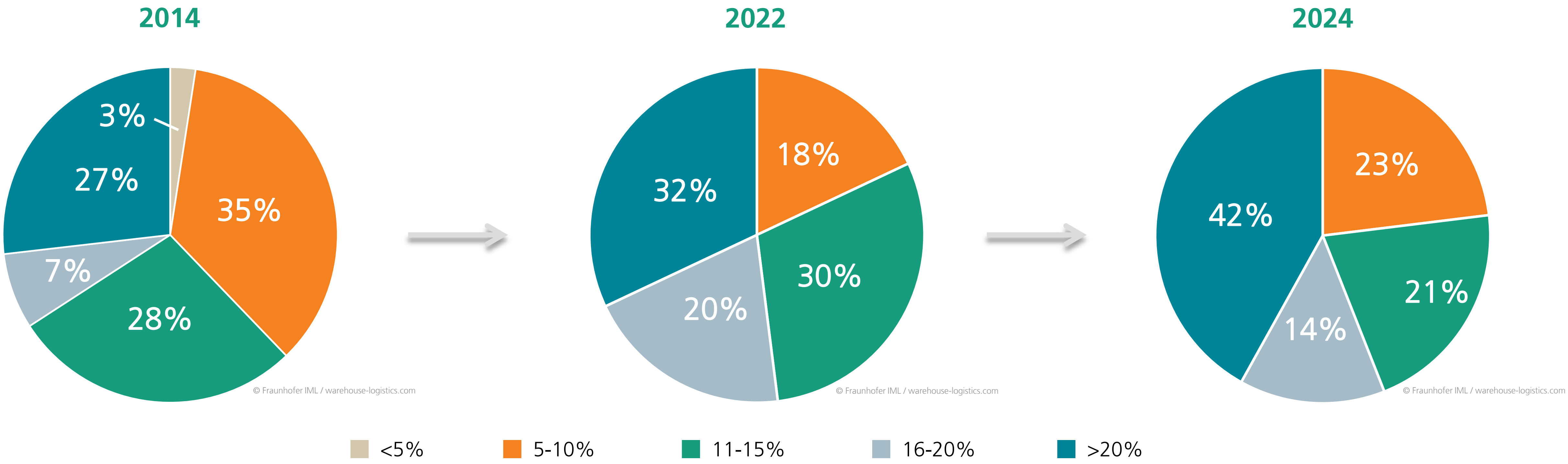
Connection Types of Pick-by-Vision-Solutions



Pick-by-vision solutions use smart glasses to optimize communication in the warehouse process. Information is displayed directly via augmented reality in the form of 2D or 3D images on the glasses display, enabling an intuitive way of working.
Actions are confirmed either by gestures with 3D glasses or via voice commands and a touchpad with 2D glasses, ensuring flexible and efficient operation.
70% of providers state that their pick-by-vision solution supports an external connection and is therefore compatible with third-party systems. Half of them offer this solution as a separate module that can only be used together with a WMS or other proprietary software solutions.
Only 10% of providers state that their solution is available as a purely integrated variant.

Development Budget

Annual Effort for Further Development of the WMS



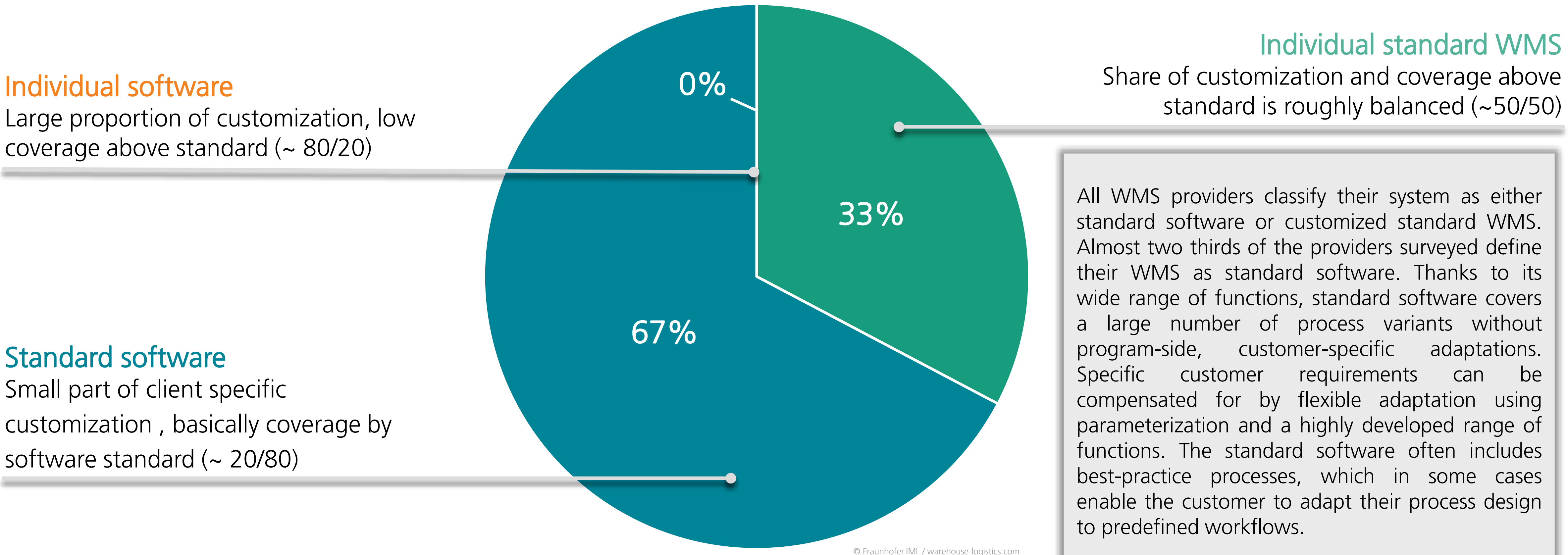
The percentage figures shown represent the annual expenditure of WMS providers on the further development of their systems in relation to their annual turnover in the WMS sector. Since 2020, all providers have invested at least 5% of their turnover in improving their systems. Since then, the investment trend has continued to rise. Compared to 2022, the proportion of providers investing more than 20% of their turnover in further development has risen by 10%. This means that 42% of providers now invest more than 20% of their turnover in system improvements.

The given data is based on the statements of the WMS providers.

The data for 2014 and 2022 is taken from the WMS Market Report Compact 2022.

Standard software vs. Individual software

Assessments of the Degree of Standardisation of WMS Providers



All WMS providers classify their system as either standard software or customized standard WMS. Almost two thirds of the providers surveyed define their WMS as standard software. Thanks to its wide range of functions, standard software covers a large number of process variants without program-side, customer-specific adaptations. Specific customer requirements can be compensated for by flexible adaptation using parameterization and a highly developed range of functions. The standard software often includes best-practice processes, which in some cases enable the customer to adapt their process design to predefined workflows.

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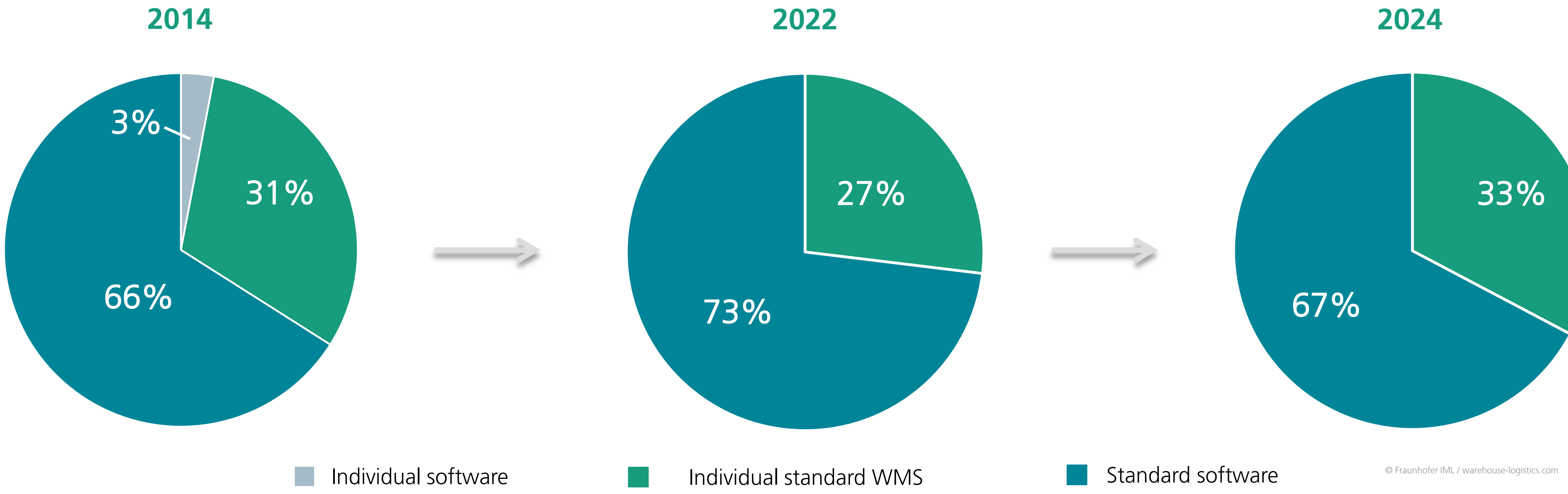
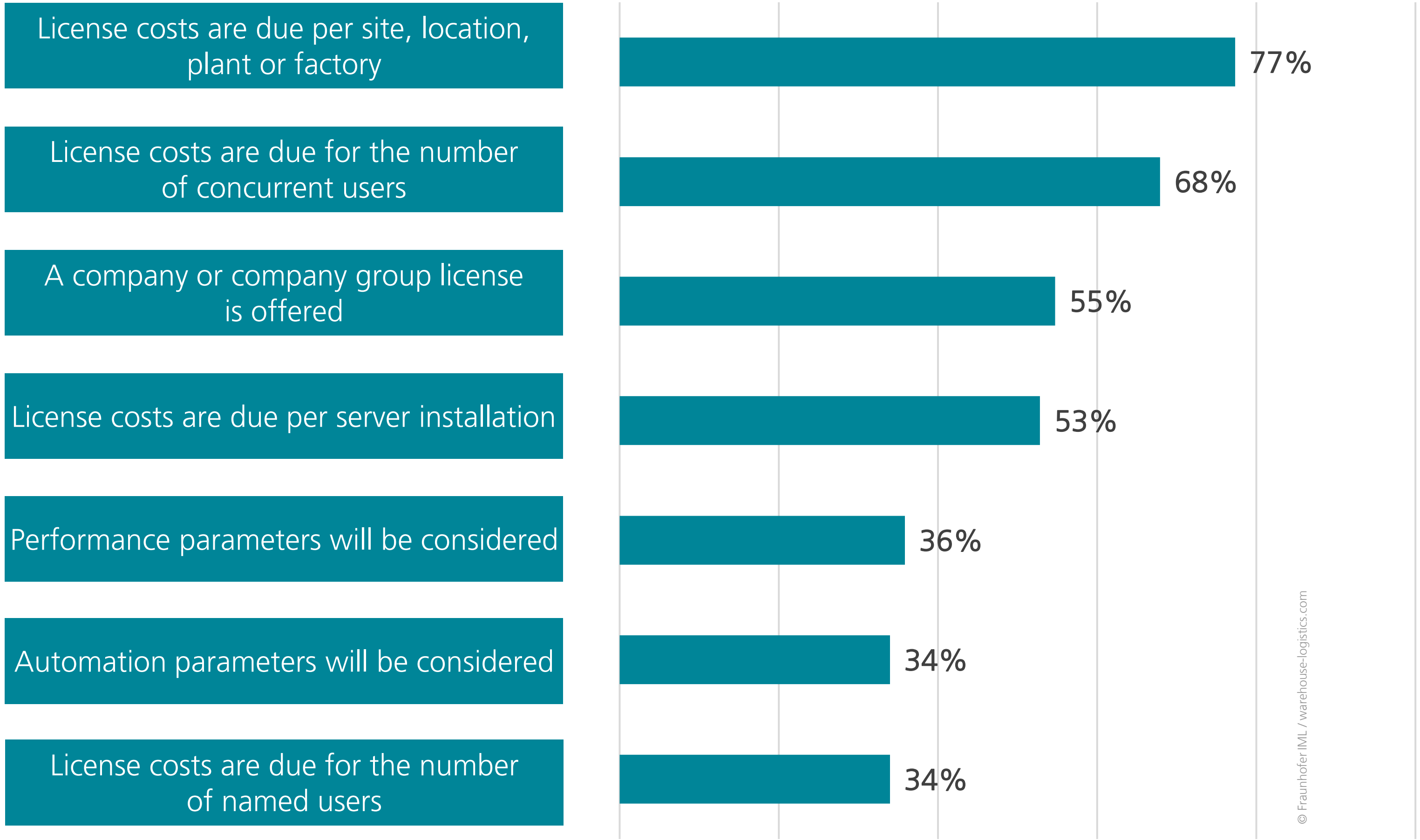
Developments in the Area of Standard Software



Since 2014, there has been a continuous standardization of the software landscape. The peak was in 2018, when 77% of providers classified their solutions as standard software. Since then, there has been a 10% decline, so that in 2024, 67% of providers classify their systems as pure standard software, while 33% define them as individual standard software.

The given data is based on the statements of the WMS providers.
The data for 2014 and 2022 is taken from the WMS Market Report Compact 2022.

Licensing Models of WMS Providers



Explanation of Licensing Models

Concurrent User:

This license model specifies the maximum number of users allowed to access the WMS at the same time.

Named User:

This license model specifies the number of users who are allowed to access the WMS with a registered, named access.

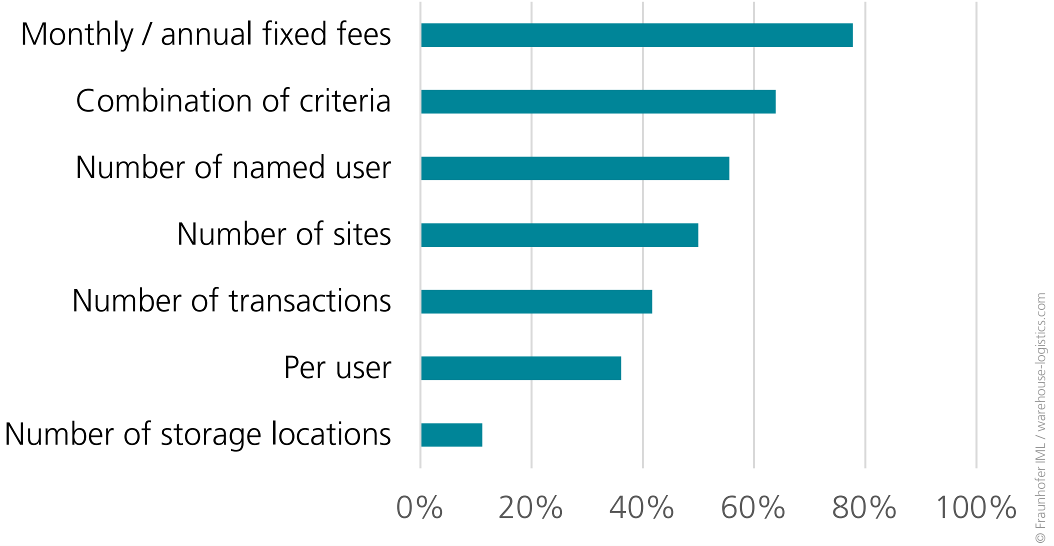
Performance Parameters:

In this license model, licensing is based on performance parameters, such as the number of order items, delivery positions, picks, cartons, etc.

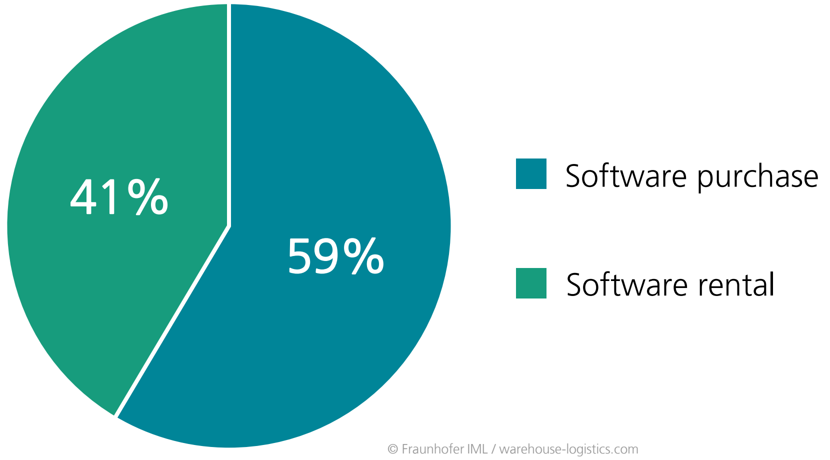
The given data is based on the statements of the WMS providers.

Licensing Models of Cloud Solutions

Revenue share of business or licensing models of WMS providers with cloud solutions



Revenue share of business or licensing models of WMS providers with cloud solutions



Various cost models are offered for the licensing of cloud systems, which are usually calculated on a monthly or annual basis. The calculation of these costs can be based on different parameters, which are often used in combination. A common calculation factor is the number of users, while the calculation based on the number of storage locations is used less frequently. The share of revenue generated by software tenants has increased by 11% since 2022, underlining the increasing acceptance and demand.

The given data is based on the statements of the WMS providers offering a validated cloud solution.

The Strongest Aspects of WMS

Top 5 Strengths of their own WMS from the Perspective of WMS Providers

1 Great functional range in standard package

2 Integration of automation technology

3 Easy adaptability

4 Possibility to individually supply of customer specific requirements

5 Usability / ergonomics

The given data is based on the statements of the WMS providers.
The given data is based on the statements of the WMS providers.

Conclusion »The Standard WMS«

Scope of functions

Selecting an appropriate WMS requires consideration of both functional and non-functional requirements. In particular, there are indispensable criteria within the functional domain. A comparison of the most common knockout criteria with the fulfillment levels of various WMS solutions reveals that there is extensive coverage available in the market.

Software

For four years now, no WMS provider has categorized its system as individual software.

Due to the expansion of the range of functions in recent years, standard software systems now have a large repertoire of functionalities, which reduces the proportion of customer-specific adaptations.

Success factors

A comprehensive range of functions in the standard can be realized through the continuous integration of functions into the standard software and remains the most important success factor.

Development focus

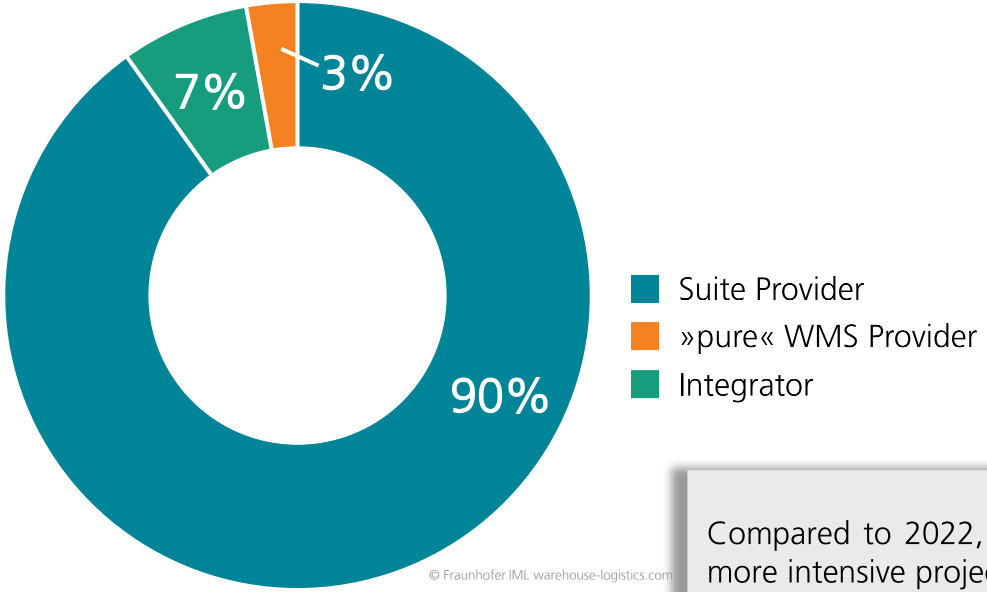
Predictive analytics, deep/machine learning, and scalable IT infrastructures are at the core of planned or ongoing technological developments. In terms of functional development, personnel resource planning is one of the top priorities. Additionally, dock/yard management and control systems are becoming increasingly important.

THE WMS-PROJEKT

Project Distribution · Level of Automation · Installations · Time Frame & Costs · Storage Technologies · Cloud Solutions · Server Operating Systems · Sector Focus · Chances

Number and Distribution of WMS Projects

Percentage Distribution of WMS Projects to WMS Provider Types in 2023



3.683

WMS projects in 2023
realised by 65 WMS providers

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Ø Number of Projects per Provider in 2023

[92] [19] [7]

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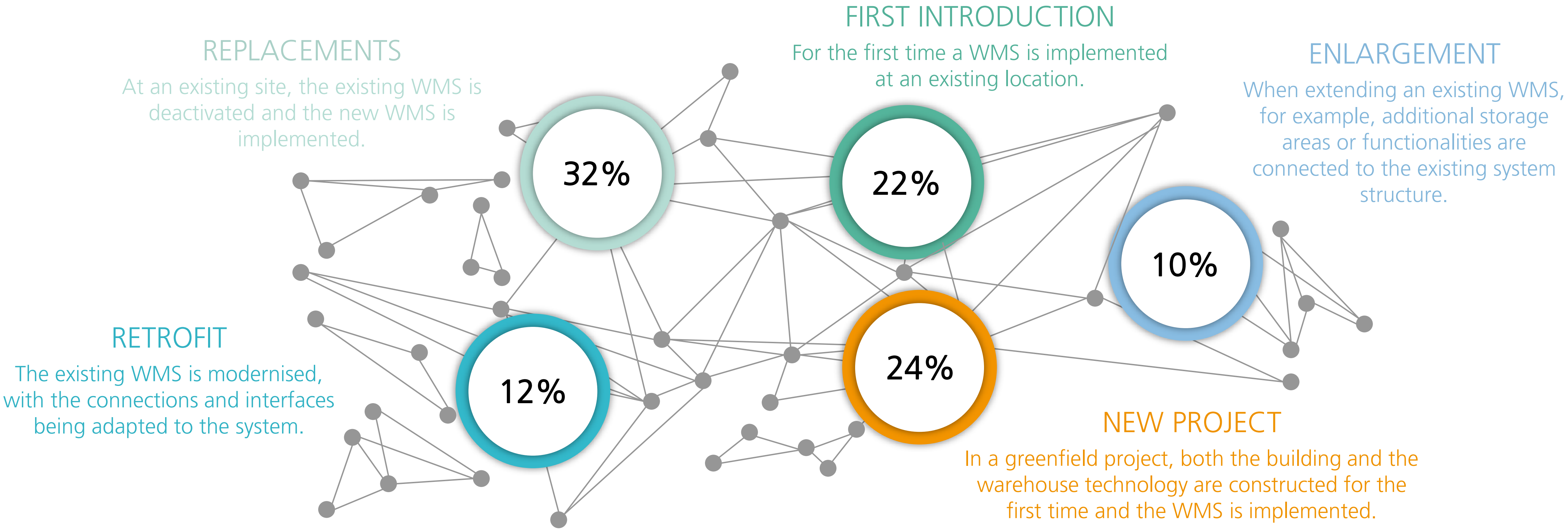
Compared to 2022, the average number of projects per provider increased by around 10%, which indicates more intensive project activity per provider. Suite providers dominate the market with an average number of 92 projects and a 90% share of all WMS projects. This shift is partly due to the fact that providers are increasingly positioning themselves as suite providers.

Customer Structure of WMS Provider

Distribution of Customer Projects according to the Project Type



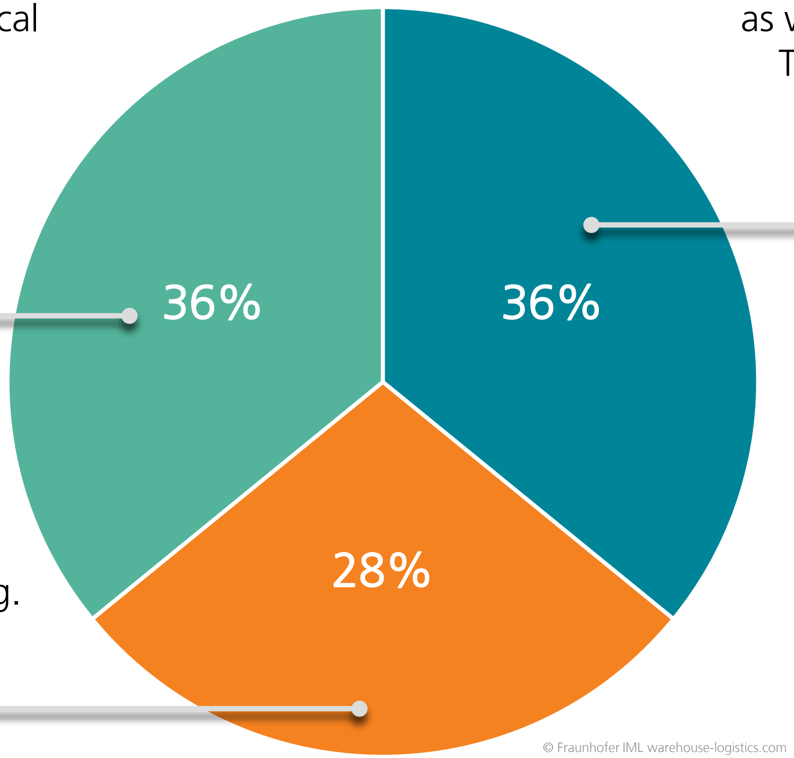
The given data is based on the values of »WMS Reference Projects«.

Level of Automation

Distribution of Customer Projects according to the Level of Automation

A fully automated warehouse is characterised by the use of automated storage and conveyor technology. Typical storage systems are automatic small parts warehouses (ASPW) and automatic high-bay warehouses. Here, the goods are transported to the employee by means of automated conveyor technology. Picking is carried out according to the goods-to-person principle.

In the manual warehouse, shelving and pallet racks as well as floor block storage are traditionally used. The goods are stored and retrieved with the help of employee-operated industrial trucks such as forklift trucks. Order picking is carried out according to the person-to-goods principle.

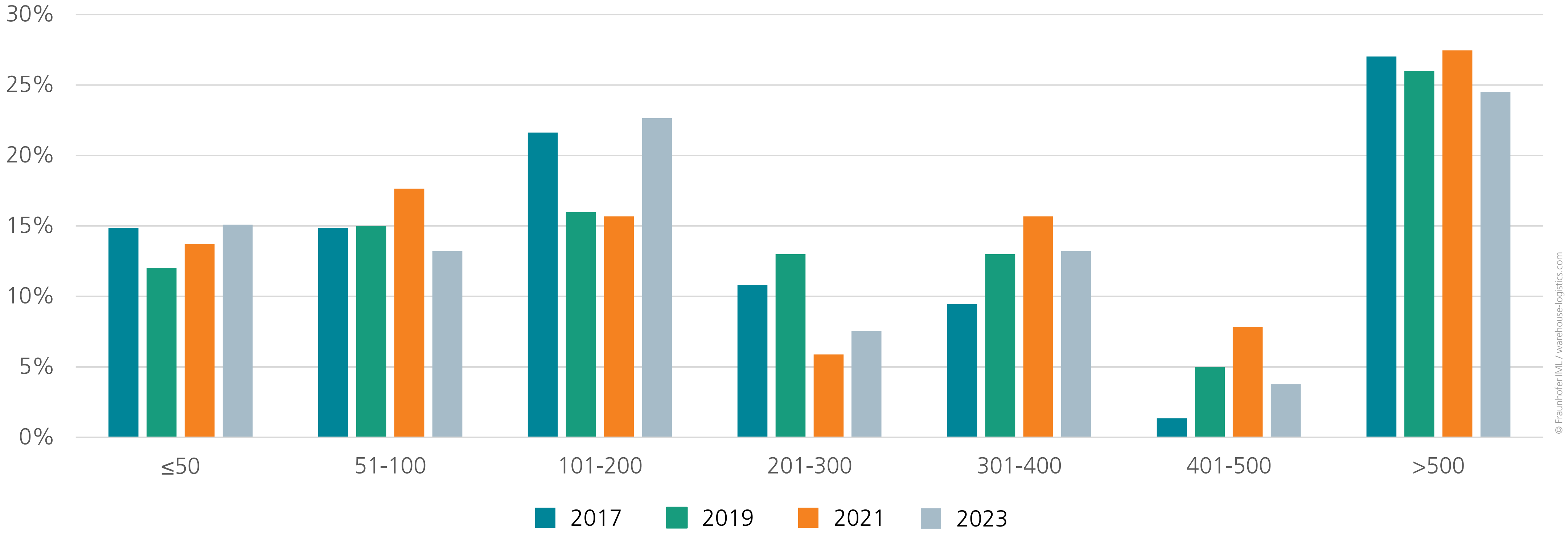


The majority of WMS projects involve semi automated warehouses.
Semi automated warehouses consist of a combination of individual automated sections (e. g. miniload) and manual storage areas (e. g. pallet rack warehouse).

The graphic illustrates the level of automation in warehouses for WMS projects completed by customers from 2023. It reveals that both automated and manual warehouses are almost equally represented, each accounting for slightly more than one-third of the projects.

Extent of WMS Installations

Number of Users in the Largest Installations of WMS Providers in 2017, 2019, 2021 and 2023

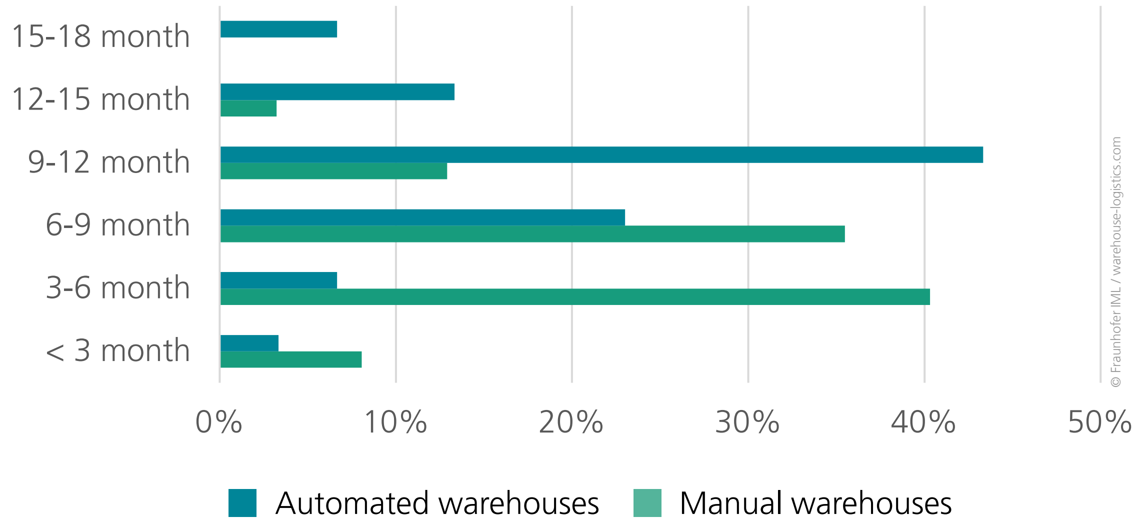


The given data is based on the statements of the WMS providers.
The data for 2017, 2019 and 2021 is taken from the WMS Market Report Compact 2022.

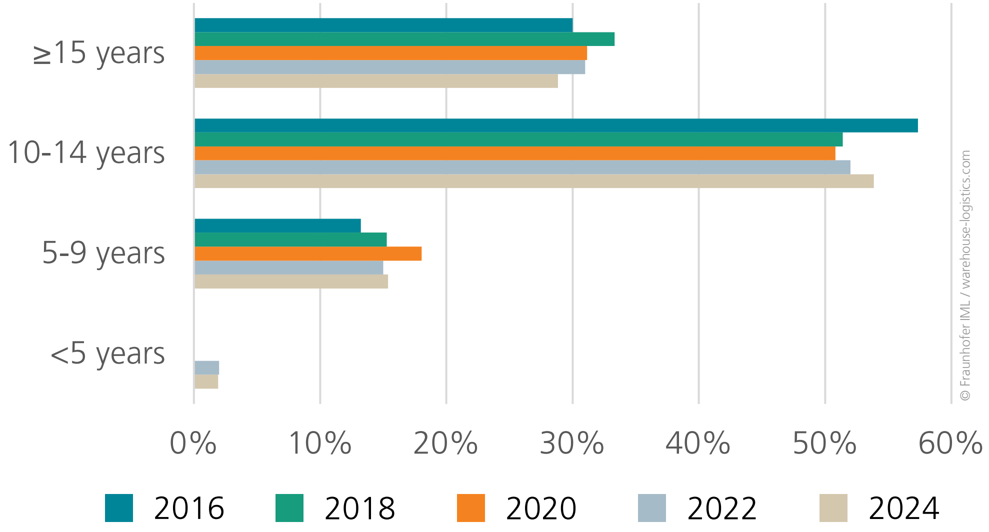
Time Frame for WMS Projects

Average Duration of WMS Implementation and Usage

Ø Duration of a WMS Implementation for Manual and Automated Warehouses for New Customers



Ø Duration of Use of a WMS according to the WMS Providers

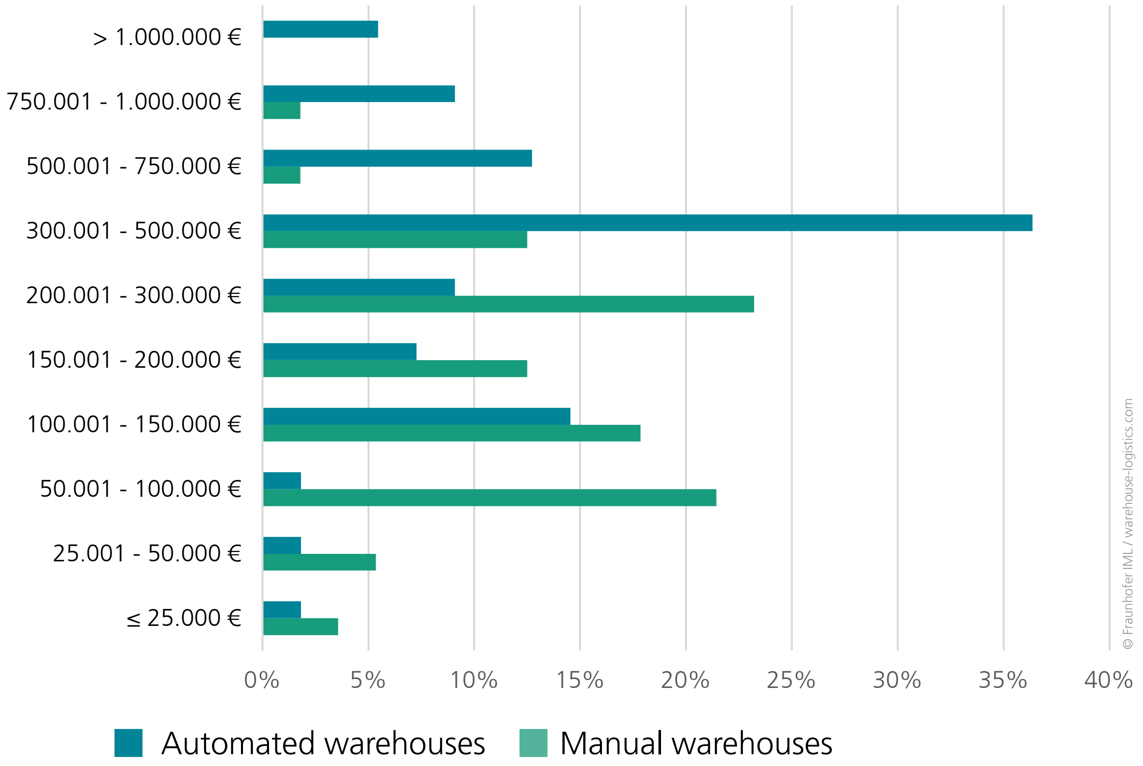


Three quarters of WMS providers state that the introduction of a WMS in manual warehouses takes 3 to 9 months. Most providers need 3 to 6 months, which represents a reduction of 3 months compared to 2022. For automated warehouses, 43% of providers calculate a project duration of 9 to 12 months. In addition, 83% of WMS providers confirm that the average useful life of their systems is still over 10 years, which emphasizes the importance of long-term partnerships.

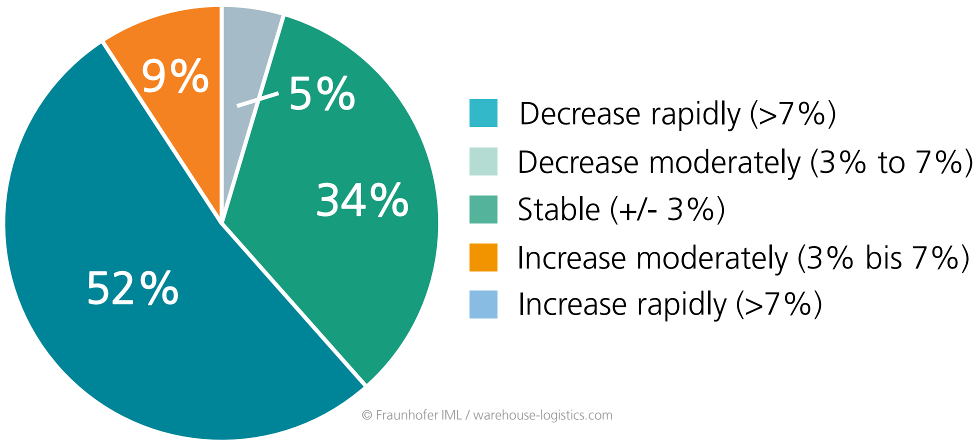
The given data is based on the statements of the WMS providers.
The data for 2018, 2020 und 2020 is taken from the WMS Market Report Compact 2022.

Costs of a WMS Implementation

Ø Project Volume with regard to the Level of Automation in the Warehouse according to the WMS Providers



Expected Annual Price Level Developments over the next 4 years



According to WMS providers, the average project volume for the implementation of a WMS in automated warehouses is between 300,000 and 500,000 euros in around 36% of projects. In contrast, manual warehouses show a variation in project volume, typically between EUR 50,000 and EUR 300,000, due to the different process complexity. Prices are expected to remain stable or rise slightly over the next four years.

Market Differentiating Factors in the Project Experience with the Connection of Warehouse Technologies

Less than **one fifth** of WMS providers say they have already implemented a project for Stacking cradle system or Parking systems.

The share of WMS providers that have implemented projects for Paternoster warehouse / vertical rotary rack has **increased sharply since 2022** representing two of the top developments.

Over 80% of WMS providers have already executed a project for automated high-bay and small parts warehouses, among others.

Small parts warehouses continues to be one of the storage technologies that **nearly all** WMS providers have already implemented projects.

55% of WMS providers say they have already implemented a project for Automated compact storage systems (e.g. AutoStore, Power Cube).

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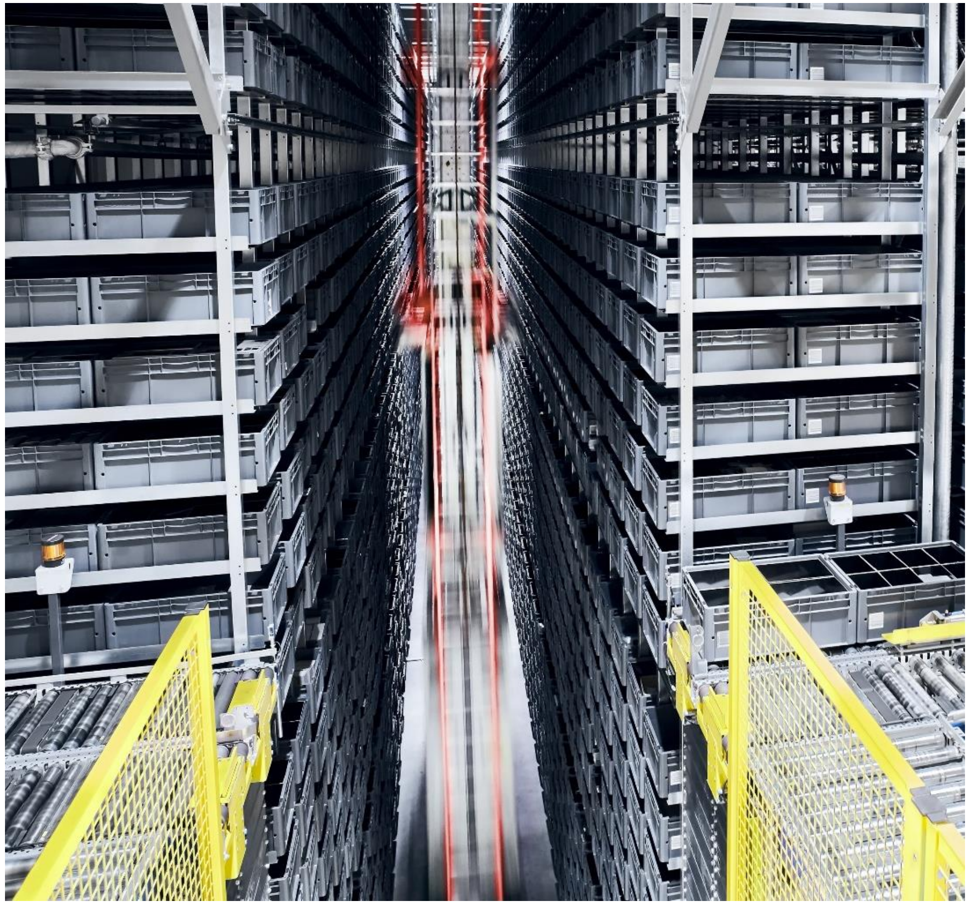

The given data is based on the statements of the WMS providers.
The data for 2022 is taken from the WMS Market Report Compact 2022.

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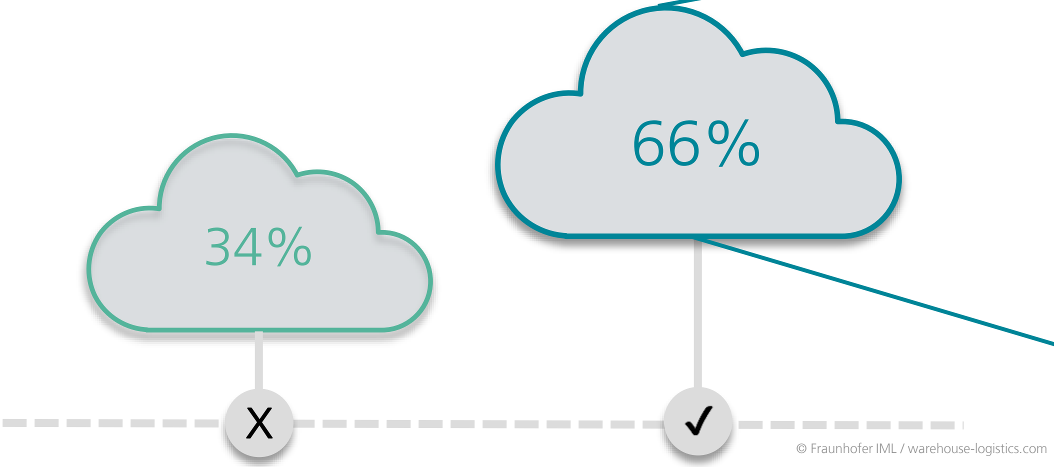
WMS as Cloud Solution

Share of WMS Providers who also offer their WMS as a Cloud Solution



Offered Architectures of the Cloud Solution

49%	Single-tenant cloud architecture only
7%	Multi-tenant cloud architecture only
44%	Both architectures

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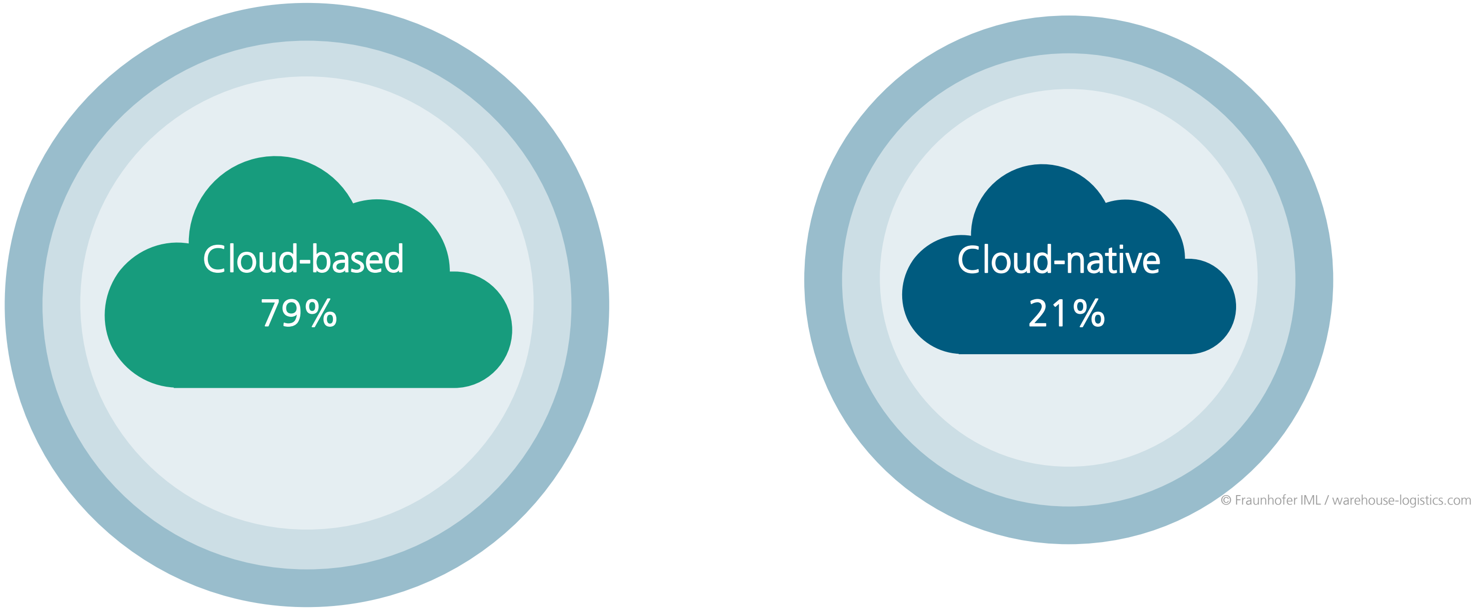
On the one hand, the increasing share of cloud computing can be explained by the higher market acceptance and the ever-increasing IT security requirements, which smaller companies in particular cannot adequately meet themselves. On the other hand, there is no longer any need for specialist staff to manage the systems themselves. The single-tenant cloud architecture remains the most common architecture. The alternative of exclusive multi-tenant cloud architecture, on the other hand, is hardly represented. With multi-tenant, all companies benefit directly from software updates. However, customer-specific functionalities are generally not implemented.

The given data is based on the statements of the WMS providers offering a validated cloud solution.

Conception of cloud solutions in the WMS market

Design of the cloud solution



The design of cloud solutions is divided into two categories:

Cloud-based refers to applications that have been optimized for operation in the cloud. In other words, they were not directly "born in the cloud", but already existed, but were further developed for operation in the cloud.

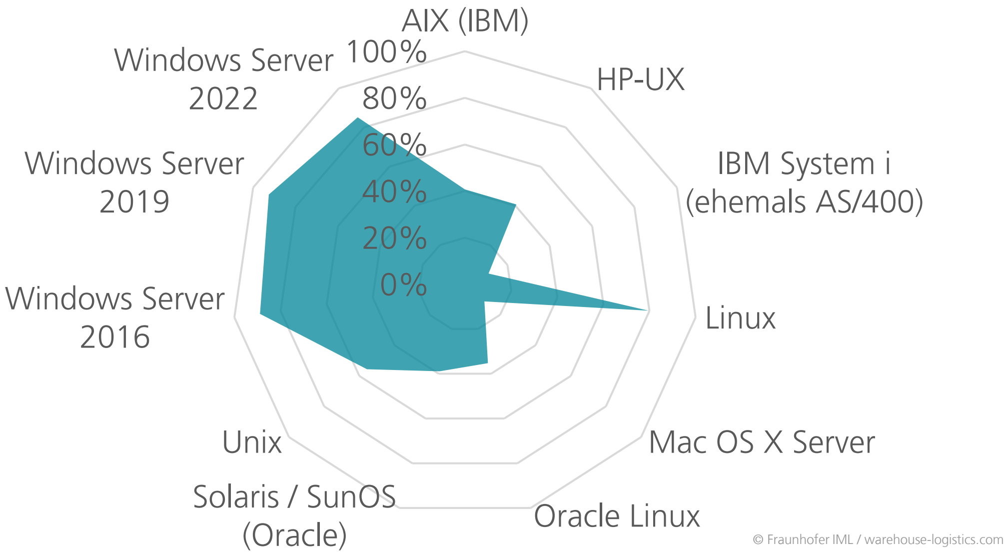
Cloud-native, on the other hand, refers to applications that were "born in the cloud". Agile, conceptual methods are used that enable applications to be developed and operated entirely in the cloud. This allows the primary advantages of the cloud, flexibility and scalability, to be utilized. Container technologies and microservice architectures are usually used for cloud-native development.

The WMS market is currently dominated by cloud-based solutions, most of which are offered by providers.

The given data is based on the statements of the WMS providers offering a validated cloud solution.

Server Operating Systems

Compatibility of WMS with Server Operating Systems according to the WMS Providers



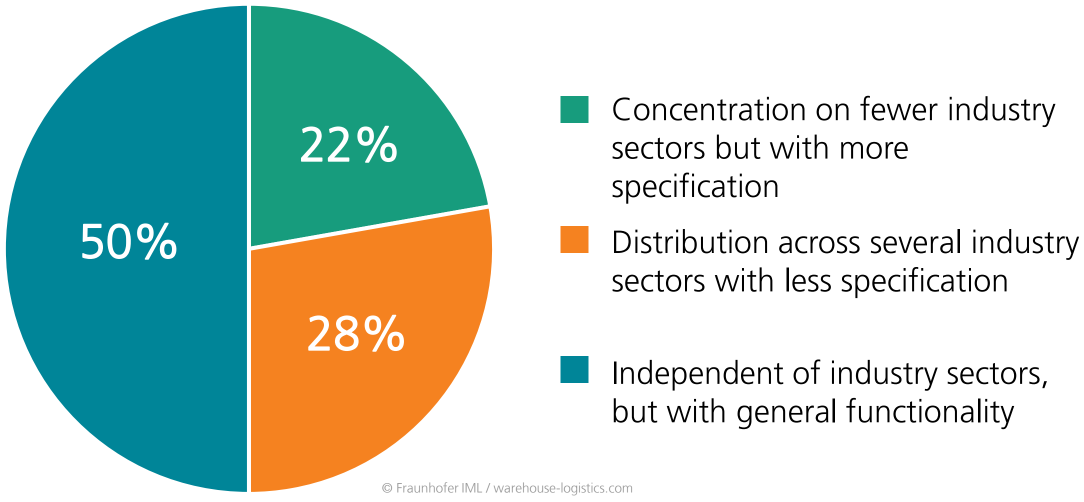
Top 3 Server Operating Systems used according to WMS Customers

38%	AIX (IBM)
29%	Linux
24%	Windows Server 2016

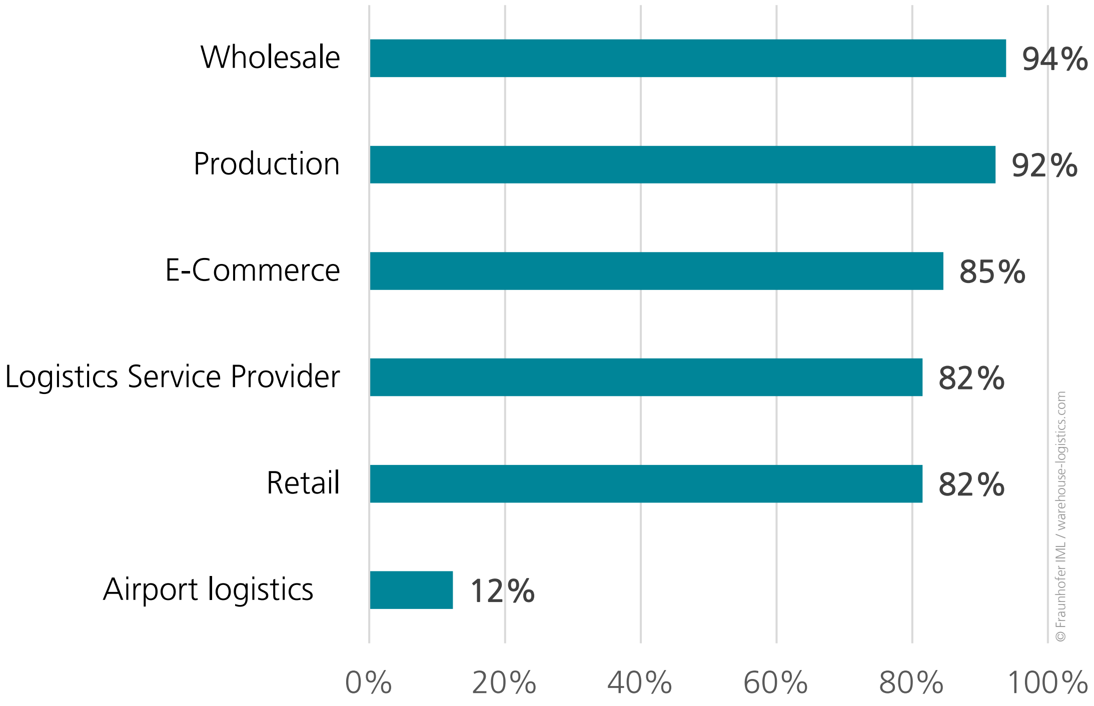
In 38% of reference projects between 2023 and 2024, it was reported that the WMS was implemented on IBM's AIX operating systems. Additionally, 41% of WMS providers state that their systems are compatible with the AIX operating system, indicating widespread acceptance and adoption of this platform within the industry.

Sector Focus of WMS Providers

Strategic Orientation of WMS Providers

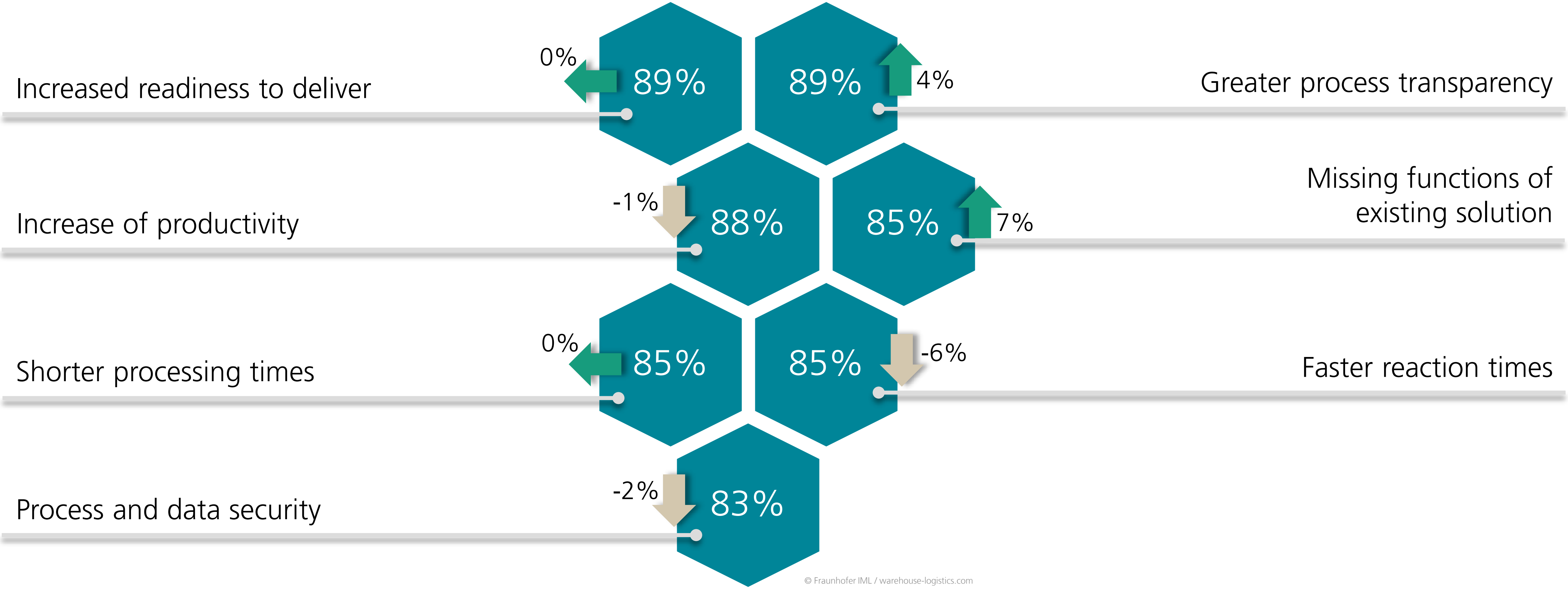


Project Experience in Various Industry Sectors



Goals for the Implementation of a WMS

Opportunities for the WMS customer



The given data is based on the statements of the WMS providers.
The comparative data for 2022 is taken from the WMS Market Report Compact 2022.

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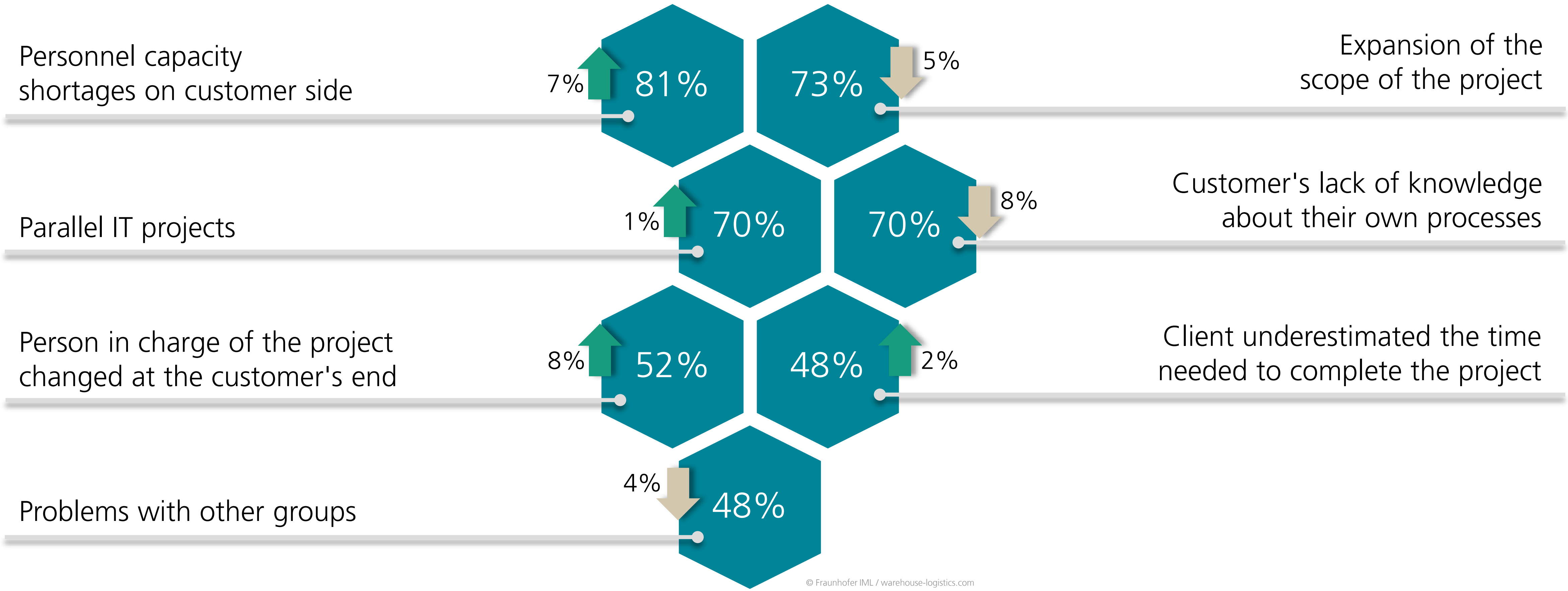
Challenges when introducing a WMS

Reasons that have led to delays / termination of projects



Criteria to Select a WMS Provider

Key issues from the supplier and customer perspective

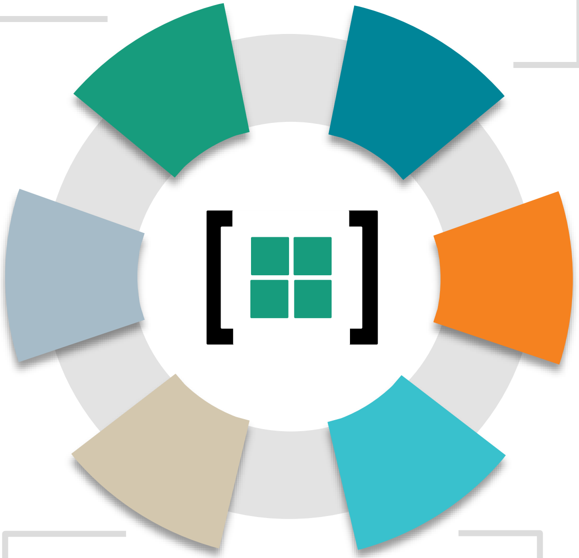
View of the WMS Provider	Top 5 Criteria	View of the WMS Customer
WMS-provider has customer references	1	Functionality
Implementation time	2	Simple Integration in existing processes and IT landscapes
After Sales Services	3	WMS provider has references in the industry
Implementation costs	4	user-friendliness
Professional qualifications of the employees	5	Simple parameterisation (flexibility)

The given data is based on the statements of the WMS providers and on the values from »WMS Reference Projects«.

Selected Aspects of WMS Projects

Distribution of WMS projects
90% of WMS projects have been executed by **suite providers**.

Implementation challenges
81% of the WMS providers see **personnel capacity shortages on customer side** as the main challenge during WMS implementation..



Usage duration of a WMS
83% of WMS providers indicate a Ø usage duration of a WMS of more than **10 years**.

WMS as a cloud solution
66% of WMS providers offer their WMS as a cloud solution.

Implementation duration
43% indicate a Ø implementation duration of **9-12 months** for automated warehouses. For manual warehouses **40%** indicate a Ø implementation period of **3-6 months**.

Goals for the WMS implementation
The main goals of the WMS implementation are **increased readiness to deliver** and **greater process transparency.**

The given data is based on the statements of the WMS providers.
The values given are based on the information provided by the WMS providers and the information from »WMS reference projects«.

Conclusion »The WMS-Projekt«

Projects

The number of WMS projects is increasing sharply. In most cases, these are first-time implementations, whereby a WMS is implemented at a location for the first time, as well as new projects, which in the case of greenfield projects concerns the implementation of the WMS.

WMS providers

When selecting a WMS provider, the focus is not only on the functional requirements but also on the ease of integration into existing processes and IT systems. A provider with industry experience and relevant references offers greater assurance for smooth implementation and meeting specific requirements

WMS users

More than half of the WMS providers state that the system has been in use for 10-14 years. Almost a third even state that the system has been in use for more than 15 years. A structured and systematic selection of logistics IT represents a strategic investment in the future.

Benefits

The implementation of a WMS offers potential benefits such as improved delivery readiness, greater process transparency, and increased productivity.

However, to realize these advantages, challenges such as personnel bottlenecks or the parallel execution of other IT projects must be considered. Early identification of these obstacles is crucial for a successful project completion.

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APPENDIX

Fraunhofer-Gesellschaft · Fraunhofer IML · warehouse-logistics.com · Team »warehouse logistics« · Current Participants · Database · Imprint

The Fraunhofer-Gesellschaft and Fraunhofer IML

32.000
employees

76 institutes
and research institutions

3,4 Mrd.
research volume

Development investment and defence research
German federal and state government base funding
Contracts with industry and publically financed research projects

Fraunhofer IML, Dortmund

> 400
employees

> 300
post grad students and student assistants

> 55 Mio.
turnover, 50% from industry and commerce

WAREHOUSE LOGISTICS

Fraunhofer IML

Selection of Current Research Topics and Projects of Fraunhofer IML

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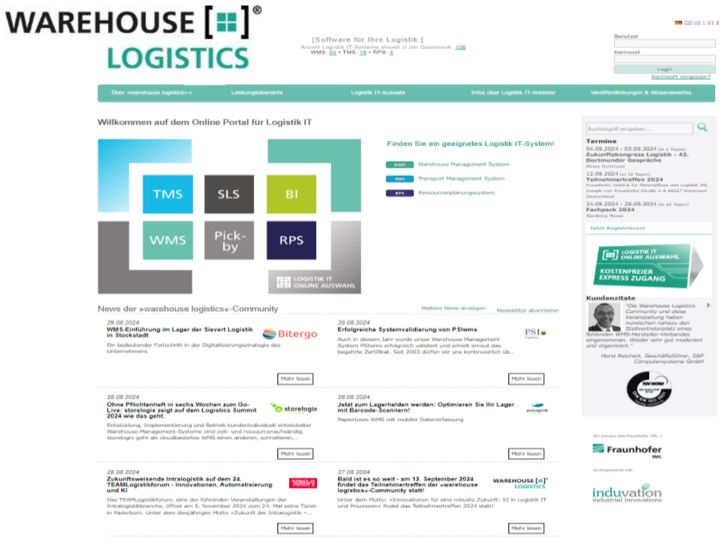
WAREHOUSE LOGISTICS Fraunhofer IML

One of the Leading Logistics Platforms

The selection of logistics IT systems at www.warehouse-logistics.com

Since 2000, supplier-independent database for the functional comparison of approx. 106 participating systems of the system groups WMS, TMS, SLS, RPS and BI.	**Logistics IT database**
Annually updated questionnaires per system group and personal validation of system functionality	**Questionaire**
Certified according to DIN EN ISO 9001 Compliant with VDI Guideline 3601	**Certified & VDI-Compliant**
Validated WMS reference projects to demonstrate project specifics and vendor expertise in the project business	**WMS Reference Projects**



Fields of Activity of »Team warehouse logistics«

1 | Knowledge Management

Preparation of market studies, execution of lectures and seminars, expert activities for trade fairs, associations or committees in the field of Logistics IT.

2 | Research

Development of new processes, methods and tools as well as studies, future scenarios and roadmaps. Operational pilot projects ensure practical suitability.

3 | Strategy Consulting

Execution of various strategy and portfolio consulting projects for WMS providers and support in technical due diligence audits on the WMS market.

4 | Logistics IT Consulting

Personal and system-supported consulting from analysis through tendering up to the introduction of a WMS or other Logistics IT systems.

Current Participants of the »Logistics IT Database«

Stand: 02.10.2024

abat · AEB · Alcman · asap logistics.de · BETA 80 GROUP · Bitergo · BLOHM · BlueYonder · BSS Materialflussgruppe · centric · CIM · COGLAS Logistic Solution · Dr. Bruntaler · ecovium · EPG · else{} · epilog · FIS · GAIA · gdv Kuhn mbH · gebhardt · GET · GIGATON · HÖRMANN Logistik · IFD · IGZ · incas · infor · itavero · JUNGHEINRICH · kardex remstar · KBU logistik · KNAPP · KÖRBER · Kugler Consulting · REPLY Logistics · LOXXESS · Manhattan · mantis · MECALUX · MODULA · MOX · ONIT · OPUS//G · ORACLE · overlog · prismat · proLogistik · PROWAY · PSI Logistics · PureLoX Solutions · Quadrivium · ReplicaSistemi Zucchetti · S&P · SAP · SAVOYE · SINFORMATICS · SITLog · SOG · SSI SCHÄFER · [stesi] · Stöcklin · storelogix · SWAN · SWISSLOG · TEAM · TGW · Unitechnik · VANDERLANDE · viastore Software · w3logistics · WANKO · Westernacher

WMS Provider

Alcman · IGZ · incas · KÖRBER · Manhattan · ONIT · prismat · proLogistik · PSI Logistics · ReplicaSistemi Zucchetti · SAP · sedApta group · SIMA Zucchetti · smeup · TRANSPOREON · WANKO · Westernacher

TMS Provider

EPG · INLAI · KNAPP · PLANCISE

RPS Provider

Database

The WMS MARKET REPORT COMPACT is based on the 24 years of expertise of Fraunhofer IML and its partners in the field of Warehouse Management Systems. Since 2000, the »Logistic IT Online Selection«, has been one of the world's leading »Logistics IT Databases« for continuous market evaluation and trend analysis and has been operated and further developed in terms of content and technology.
For the » Logistic IT Online Selection« as well as for the »WMS Reference Projects« the »Team warehouse logistics« developed questionnaires to capture relevant information

- about WMS providers,
- about the functional scope of the systems and
- to evaluate current and future trends and developments
  on the WMS market.

In 2024, the questionnaire behind the »Logistics IT Online Selection« covered around 3.700 criteria, the questionnaire for the »WMS Reference Projects« covered around 500 aspects. The data of the completed questionnaires (up to September 2022) were aggregated and evaluated. The data is presented cumulated and anonymized and is supported by tables and graphics.

If not explicitly mentioned, the data, graphs and tables refer to the year 2022. The data were collected from all participating WMS providers and systems through personal expert interviews (within the annual validation).

According to the »warehouse logistics« advisory committee, the participants of the »WMS Database« represent approx. 90% of the relevant providers in the markets considered.

Key Figures of the Study

Category	
Total period of the assessment	February 2012 until August 2024
Main period of the assessment	March 2024 until September 2024
Total number of involved WMS providers	112 Provider
Total number of involved systems	135 Systems
Number of systems participating in the 2024 assessment	55 Provider
Number of systems participating in the 2024 assessment	58 Systems

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