Strategic requirements of digitalisation for HRM in the logistics sector

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1. Introduction

In 2020, the management consultancy in human resource management (HRM) wrote Birdiematch:

"Germany is the logistics world champion but performs at district league level when it comes to recruiting. Sad but true: while digitalisation is increasingly ensuring top performance in supply chain management, recruitment in many companies has fallen out of time." (Birdiematch, 2020)

It must be noted that development is slow to take off and there are still massive gaps in digitalisation at all levels and areas of intralogistics (Hartel, 2019; Evangelista et al., 2023).

The increasing demands on internal logistics contribute to tensions between technological innovation and a shortage of skilled workers. Unfilled positions and a lack of personnel can be observed. The shortage of skilled workers extends across all functional areas of logistics and necessitates alternatives in digital and automated areas. However, the technological transformation also places demands on job profiles and processes in logistics. In order to achieve high acceptance of digitalization and change processes among existing employees, as well as to attract new employees who are capable of meeting the demands of the technological changes. Both are prerequisites for successful organizational change in intralogistics (Eisenmann et al., 2021).

Companies are not yet efficiently and resiliently positioned in the relevant area of customised and efficient staffing and further development because requirements are not precisely defined with company management (Hartel, 2019). This affects all qualification levels, from standardized routine picking tasks to highly skilled professions in the operation and maintenance of software, hardware, and systems (Eisenmann et al., 2021). The requirements arising from digitalisation, are not sufficiently analysed internally to determine whether these processes should or must be implemented or further developed. Currently, manual processes still dominate in intralogistics, particularly in loading and packaging, while order picking and storage are becoming increasingly semi-automated. Storage accounts for the largest share of automation, representing approximately one-third of logistics companies (Steck, 2025).

It is necessary for companies and their management to make HRM more agile and flexible in order to have the personnel to fulfil orders for every situation, every order and individual requirements of intralogistics (Malik, 2018; Ammirato et al., 2023; Esan et al., 2024). This implies a strategic orientation of HRM and ranges from simple qualifications to specialised personnel. Under conditions of volatility, uncertainty, complexity and ambiguity in economic terms as well as external influences in geopolitics and legislation, a target-orientated HR strategy has become increasingly

important. This necessitates use of continuous skills development for existing staff with digital learning platforms and practical training. At the same time, it is necessary to look for new staff according to requirements and promote them in such a way that barrier-free integration is possible (Esan et al., 2024). As a result, HRM is no longer just a separate part of the organisation, but an integrative part of strategic planning and increases efficiency as well as resilience in internal logistics against emergent and foreseeable changes (Esan et al., 2024; Rukadikar et al., 2025; Arefin and Jannat, 2025).

The definition by Ridder (2013) is decisive for the present understanding of strategic HRM.

"Strategic human resource management is understood here as a frame of reference that emphasises the strategic importance of human resources, closely links HR tasks to the strategic goals of the company and asks whether certain combinations of HR instruments can support strategically intended results."

As HRM develops from a passive personnel administration to an active part of corporate strategy, it is part of strategic planning and elementary for a efficient and results-oriented operationalisation of processes. Management serves here as a determining top-down connecting element. The definition of success criteria for qualifications is combined with a results-oriented strategy formulation, which can also be consistently operationalised (Malik, 2025). The use of digital tools in planning and development of qualifications is also a necessary focus of digital HRM (Mohammad et al., 2025). These requirements also necessitate a new qualification of HR departments, as they still have little experience in operational business and continue to rely on traditional, mostly static HR work. Digitalisation in operations management is rarely analysed, evaluated and appropriate measures derived at. A connection in relation to digital HRM as a success-orientated strategy of recruitment and training therefore exists as a research gap in HRM in logistics, which this approach aims to close to some extent. The following questions will therefore be investigated:

Q1: What are the effects of digitalisation in HRM for the logistics sector?

Q2: How can digitalisation in HRM be used for the logistics sector?

Q3: What measures are strategically necessary for efficient HRM in logistics?

2. Methodology

HRM in logistics is not sufficiently prepared for the possibilities of digitalisation and therefore continues to act in a rather classic and non-strategic manner. The aim of the article is to present the existing possibilities of digitalisation in HRM and how these can be implemented efficiently and in a results-oriented manner in intralogistics. The project-oriented SMART system (specific, measurable, ambitious, realistic, timed) forms the basis for HRM-relevant task clarification (Hartel, 2019; Project Management Institute, 2021; Wagner and Ohlig, 2022).

- Specific means a concrete description of the requirements, tasks and processes of the intralogistics process chain and individual workflows in collaboration with relevant departments and company management.
- It must be measurable that an improvement or ultimate fulfilment is possible with certain factors. This is very closely linked to personnel issues and strategic HRM in order to have sufficient personnel and to promote them in such a way that orders and their practical and technical requirements can be fulfilled through digitalization and automatization in intralogistics.
- Appropriate means an implementation that either appears to be realisable with given resources or reveals necessary adjustments that need to be incorporated. This also includes HRM measures to implement necessary knowledge of relevant processes and process steps for each order among logistics employees.
- Relevant in this context is synonymous with requirements for staff that cannot be

demanded from the outset but develop in the process with further training and education. In order to meet changing processes in the future, companies must develop qualification strategies for existing and new employees. The use of competency models provides essential support in this regard. This ensures that knowledge levels and applications are adapted to business requirements. A separate condition is that it is not absolute specialists but generalists who best fulfil these requirements, as generalists with a high level of basic knowledge are more adaptable to new requirements in technology and practice.

- Scheduled as a factor for the correct coordination of necessary measures in HRM to prepare existing personnel and the timely search for personnel.
- Hartel (2019) notes that SMART is a problem area for many companies, especially in logistics. The reason for this is that HR issues are often isolated from this important part of strategic and operational management.

Measures and instruments must be utilised in such a way that they correspond to the objectives and strategies of a company management and can be integrated into company's operational business in a results-oriented manner. The focus on project-oriented order fulfilment as an efficient strategic orientation result in a simpler and more effective operationalisation of processes in logistics. This is fundamental in HRM, as HRM is evolving from an isolated and passive involvement to an actively integrated part of an overall strategy. The interaction between relevant departments and company management is the basis for determining requirements with the support of SMART approach in all affected areas of logistics, which also involves HRM. It therefore plays an important role in promoting the real skills required and the right recruitment in form of personnel and time management in recruitment.

The presentation of the problem in the subject area intralogistics is discussed based on literature and implemented in a practically oriented and applicable framework for operationalizability by means of a separate approach for logistics.

In terms of content, there are two relevant limitations in the subject area. Much research in the field of technology-supported HRM deals with artificial intelligence (AI) tools. However, digital tools need to be more clearly differentiated from AI tools, as they have different uses (Bindra and Bhattacharya, 2025). In order to make AI usable, it is necessary to switch to digital instruments and implement them in processes (Buxmann and Schmidt, 2019; Veshne and Jamnani, 2024). AI is primarily applied to property testing procedures (Aktürk, 2021; Rukadikar et al., 2025). AI can also be used for resource and route planning as well as load optimisation in ERP systems (Fesefeldt, 2018; Aktürk, 2021; Zirar et al., 2023). As there are considerable hurdles associated with AI applications in Europe (data protection, fundamental ethical problems and personal rights) (e.g. García-Navarro et al., 2024; García-Madurga et al., 2024; Veshne and Jamnani, 2024; Kassa and Worku, 2025), AI is excluded from the topic.

The treatment within the article is also limited by the omission of HR marketing, which is not considered relevant for a fundamental switch to digital support in HRM. This would be relevant for additional research.

Based on literature, the following findings and a necessarily limited state of research on the topic emerge. Logistics has a high potential for optimisation in industry and retail, which would not only have a positive impact in service areas, but also offers a significant cost advantage for companies (Gudehus, 2015). On average, distribution and logistics costs account for 20% of a company's total costs (Tripp, 2019; Di Fabio, 2020).

Competences in distribution logistics according to Tripp (2019) are

- Material resources: means of transport, loading aids, storage space, warehouses, warehouse technology, handling/sorting technology, drivers, warehouse and

handling staff, order processing systems and warehouse management systems.

- Intangible resources: Technical, methodological and experience-based knowledge of employees about processes and responsibilities in company as well as customer-specific expertise about special handling features.
- Skills: Professional, methodical and social skills in dealing with employees, internal and external customers or suppliers as well as conceptual-analytical skills for planning, managing, implementing and controlling measures and co-operation partners in distribution processing.

Company management is responsible for an efficient implementation of HRM measures. It sets targets, organises areas of responsibility within departments and coordinates tasks for employees or teams. The allocation of resources is controlled by setting priorities. This also includes how employees can be developed and promoted. This is where modern HRM plays an important supporting role (Helbich and Herzig, 2018). It is therefore necessary to apply and generalise new knowledge, skills or abilities that are required in internal company processes (Kauffeld and Grote, 2019). Richenhagen (2015) speaks of generalists with pronounced management expertise.

The need for companies to provide HRM services that meet their own requirements has increased over the last ten years. This is due to curricula in training areas that do not meet the requirements but are needed by companies. Lee and Pfeiffer (2017), Dengler and Matthes (2018) and Harteis et al. (2019) have found that curricula in vocational training programmes have not been adapted to digital uses in companies and are therefore not sufficient to ensure the quality of graduates. In addition, too little is invested in knowledge of other economic and technical skills with the specialist knowledge of logistics in general (Masad et al., 2025). Although this results in specialists, there is a lack of broad-based knowledge for a necessary flexibility to meet individual business requirements. As a result, companies have to take their own initiatives when hiring new staff in order to bring them up to an effective and efficient level. This takes time and incurs costs that companies have to invest without benefiting from labour and performance.

In intralogistics, demand management concepts are relevant in order to coordinate measures between sales, purchasing and logistics to achieve sales (Groß & Pfennig, 2019). A close network constellation in companies between sales, purchasing and logistics is important in terms of demand and forecasts, as well as inventories and orders, as otherwise no targeted logistical quantity and capacity planning of transport processing, transport utilisation, space availability, personnel planning, personnel availability as well as technology utilisation and technology robustness can take place (Evangelista et al., 2023; Masad et al., 2025).

Due to the diametrically opposed development of available trained personnel and operational requirements, strategic HRM is required. This starts with routine processes, such as a lack of professionalism in daily cross-docking planning or the operational development of existing automation and robotics (e.g. shuttle systems). In addition, a support function through digital training opportunities is important for new requirements in order to adapt existing personnel to them. At this interface, an essential planning function is required for departmental and company managers in order to coordinate current and future requirements and initiate personnel-related decisions accordingly. This is due to the existing qualifications of logistics personnel, which have not yet been adapted to new requirements of profession in the area of training. This also includes the necessary expansion of further and advanced training for existing personnel, which is still very low in many European nations in terms of qualifications. In theory, this demands a high level of personal initiative from employees, but this contradicts the requirements of companies. Promoting knowledge and qualifications is a fundamental component of leadership

management (Tripp, 2019; Gehrke et al., 2020). Above all, this includes new automated and digital-technical processes that are supported, accompanied or monitored and maintained by human workers (Zhang et al., 2021). Here, the basic vocational training for these skilled occupations has not yet been further developed to meet current requirements or is adapting much more slowly to real technical developments in terms of content (Harteis et al., 2019).

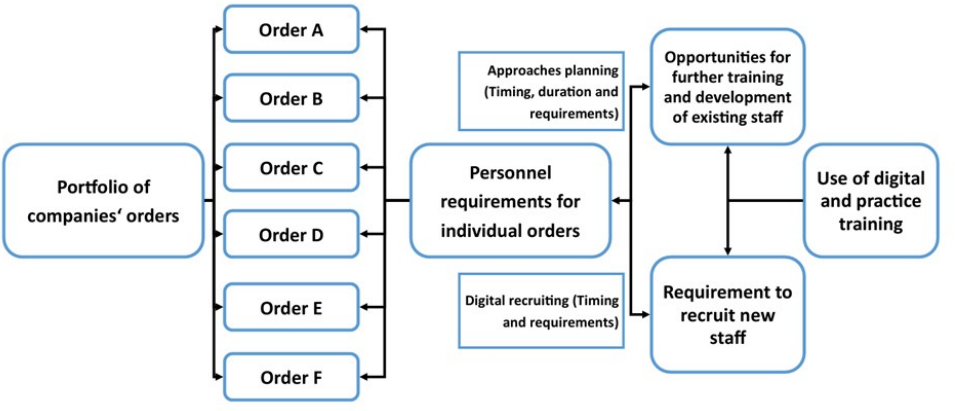
In order to utilise approaches and methods within the company, knowledge and its transfer are particularly useful for bringing staff up to a usable level of work requirements. In order to be able to integrate this as efficiently as possible into the work process, digital training and further education measures are useful (e.g. Zirar et al., 2023; Rudi et al., 2024; Kristanto and Mansur, 2025).

For logistics, HR departments employ people who are subject to general qualifications and have little insight into the operational business. Integrated management roles with a results-orientated strategy to drive operations are rare (Masad et al., 2025). However, integration experience should be generalised and applied to future HRM integrations, considering the case-specific and increasingly complex environmental variables and their interdependencies (Kauffeld et al., 2019; Arefin and Jannat, 2025). By considering environmental conditions in technological, economic, ecological, social and political areas of a company, the profile requirement is a cross-system holistic way of thinking with a generalist approach (Arefin and Jannat, 2025). Individual learning ability and self-regulation are important here, whereby there are constant interrelationships between the organisation of and demands on work, regulatory abilities and operational requirements (Bugge, 2015). This includes internal company processes as well as processes in relevant intralogistics (Esan et al., 2024).

3. Results

The realignment arises from current gaps in operational HRM. The new framework is clarified through a top-down mission clarification between company management and HRM using the SMART methodology. HR project objectives should therefore be formulated using the SMART rule. Individual customer requirements and the resulting demands on intralogistics within the company, tailored to individual needs in the processes, must be considered from both a technical and employee perspective (Tripp, 2019). The specificity of each individual assignment as a project refers to the concrete naming and description of success parameters (requirements, tasks and competencies) so that an objective can be recognised as fulfilled upon completion. Specific metrics should be included in the design of an objective. These are also included in the consideration of personnel resources so that the right personnel with appropriate qualifications are available at the right time and with suitable measures. Personnel targets can therefore be actively influenced and optimised for each individual project/order. The project-orientation of all orders results in a process flow as shown in the following figure.

Figure 1 >> *Framework structure for the order-orientated personnel strategy*



Source: own

As orders are known and have a fixed time for fulfilment, it is possible to determine the resource requirements for each individual order. This also applies to personnel requirements, which show whether orders are standard orders that can be completed with the existing personnel. If orders turn out to be special services, it is necessary to determine whether the existing staff can fulfil these performance requirements or whether certain training and further education measures are required. There is also the situation that orders cannot be completed in this form with the existing personnel, as more personnel are required for timely fulfilment.

As an integral part of strategic planning, the HR department can be organisationally integrated into needs and results-oriented requirements. This means that the relevant employees are already planned into the process when they are included as an assignment. Generalisation and specialisation are not disjunctive states of an employee, but rather a situational continuum. Specialisation is achieved through appropriate qualifications and experience - but this does not restrict generalist work as the ability to think one's way into other disciplines and their paradigms (Müller and Müller, 2019). The tasks here extend to the development of relevant further education and training tools as well as the allocation of employees for these measures. The top-down approach presented here takes into account the company's goals and strategy. Goals and requirements are derived from the corporate strategy. Based on this, the goals for the respective positions can be developed and then translated into concrete job requirements, it is advisable to use both digital tools for the theoretical requirements and competencies for the tasks (Hartel, 2019) and practical training units, should these ne necessary (Kohl, 2023; Masad et al., 2025). This transforms traditional administrative HRM into a strategically organised planning unit that is integrated into all processes and can react in an agile manner. The basis for this are digital internal networks with all relevant departments and the company management as well as external networks for obtaining information if the company's own knowledge is not sufficient (Arefin and Jannat, 2025). The following content is relevant for measures (Ackermann, 2018)

- Clear identification of knowledge areas Quick and better understanding of systems.
- Key processes of a required knowledge area are described in detail.
- Functions and activities in the required workflow are listed.
- Information about special customer requirements, legal requirements, security aspects, digital and technical requirements that are important for the order.

At the same time, the HR department is able to start personnel searches at an early stage in

order to identify and recruit missing personnel and also to familiarise them with general requirements of the company and orders by means of training measures. This requires HR departments to adapt to digital application procedures and consider all target groups that are to be recruited as future employees. A digital assessment with gamification or psychometric procedures is worthwhile for the selection of applicants in order to identify suitable candidates (Magdalenić and Luić, 2025). The transfer success of HR measures corresponds to the implementation and generalisation of what has been learned in the workplace - i.e. in a company through internal training and further education - and indicates the extent to which the transfer from the learning field to the working field has been successful (Kauffeld and Grote, 2019).

The approach of order-oriented strategic personnel planning enables companies to prepare efficiently for their own induction training for new personnel and requiring qualification, thereby maximising benefits. In processes initiated by customers, this is only possible through management that allows company management, department heads and the relevant specialists to plan strategically together and, at the same time, efficiently implement all individual requirements for each job. This leads to a stabilisation of the entire order fulfilment, as all processes are known and their individual requirements are determined. The most important components of stabilisation are critical reflection on processes and results, documentation of entire organisational processes, evaluation of the individual processes and necessary measures (Kauffeld et al., 2019).

4. Discussion

Traditional management models and styles are increasingly being scrutinised and are less suited to volatile digital times. Strategic HRM must derive measures for the core workforce and develop further training measures in intralogistics, the effectiveness of which must be reviewed or monitored in day-to-day business. However, Groß & Pfennig (2019) see a fundamental problem here in the collaboration between relevant departments. In reality, implementation is often difficult because logistics and IT-specialists frequently talk past each other, and management often grits the teeth in face of rising IT costs. According to the findings of the two researchers, half of all IT projects have failed for many years for the reasons mentioned.

Practical experience shows that the permanent and purely numerical availability of data often presents managers and controllers with the problem of categorising results and deriving meaningful measures. Both company management and HRM must be prepared to derive personnel measures from practical experience and inefficient processes. To this end, digital technology, applications and programmes must be used even more intensively in order to make the best possible use of them for results-oriented practical implementation (Shtuler et al., 2021; Lei, 2023; Magdalenić and Luić, 2025).

Schmitz et al. (2025) conducted 40 expert interviews and an online survey of large German companies. The researchers found that 75% of the companies require employees to have higher qualifications and further training in the logistics sector due to digitalization. This demonstrates the continued relevance of the transformation of logistics processes in both HRM and internal responses to qualitative need.

The transformation affects managers by requiring them to be more flexible, more situationally appropriate and, not least due to the shortage of skilled labour, more employee-oriented, too (Enste et al., 2020). As a result, more and more agility is required in management tasks, which allows company management to make right decisions at all levels. The basis for this is knowledge of all relevant aspects that take place in a process (Haas, 2018; Esan et al., 2024). The strategic agility focused on here arises when organisations generate a range of resource and capability alternatives for employees and their interaction within the organisation, which is

capable of producing company-specific, competitive performance (North, 2018; Zandia, 2018). As a result, leadership is moving from distance to flatter hierarchies, which requires more interaction and communication at all levels. It must work with relevant departments to define knowledge objectives for employees, which are incorporated into appropriate measures. These knowledge targets must also play a central role in recruitment by preparing the knowledge and experience of existing employees and new hires through targeted knowledge transfer (Pekruhl et al., 2018). This results in significantly faster and better familiarisation of new staff without high time losses and costs (Nguyen-Hadi Khorsand et al., 2023).

In the field of intralogistics, fast and efficient solutions are urgently needed in the area of HRM and requirements for recruiting the necessary personnel. To this end, the integration of HRM into decisions at a holistic company level is an essential component of a company's success. To achieve this, it is necessary to involve company management in order to obtain quick personnel decisions and implement these within optimised recruitment processes on a digital level.

The aim of intralogistics must be to combine demand, order design and requirements for the fulfilment of orders with the need for personnel to cope with them. This requires not waiting for jobs to become vacant before initiating an application process but understanding the orders as a project and providing them with necessary resources (Malik, 2025). The fact that all assignments are subject to a milestone process means that a company can definitively determine its staffing requirements. This applies to both current and future orders, which sometimes place different demands on logistics. Companies must put themselves in a position to have exactly the right number and qualifications of personnel at certain time to fulfil each order with the corresponding requirements.

Previous personnel searches and recruitment have focussed on finding people, followed by integration and ultimately longer-term retention. Such approaches are less strategic and more focussed on a task description.

Haas (2018) assumes a high benefit for intralogistics decisions, as the high degree of interconnectedness of companies in intralogistics elements is the starting point for a growing decisions tree and thus has high potential for the generation and recording of data. Particularly in the area of intralogistics collaboration, this a basis for decision-making in order to condense the information developed from data into effective decisions and to further develop it as new knowledge.

More important with regard to a strategic orientation of personnel policy are the questions of 'why' and 'what' personnel are needed for are much more important in terms of the strategic orientation of HR policy (Trost, 2018, Esan et al., 2024). This opens up new possibilities for the search strategy, which can move away from filling positions with the so-called 'best', but rather with generalists who are fundamentally broadly trained and possibly experienced (Kels et al., 2015; Malik, 2018). Generalists are characterised by the fact that they perform different tasks in their field and can also be trained more easily to meet internal requirements through further education and training (Kauffeld and Schulte, 2019). The search for generalists makes sense because they can adapt more easily to new processes and procedures. Generalists have the necessary and sufficient skills in their tasks as well as extensive knowledge, which allows them to position themselves better strategically and act more flexibly operationally. Those lacking knowledge in their profession can quickly and efficiently adapt to entrepreneurial and task-orientated processes through further education and training (Veshne and Jamnani, 2024; Arefin and Jannat, 2025).

In an upgrading scenario with higher qualification requirements in logistics, it can be confirmed that tasks are becoming increasingly complex due to digitalization, and therefore employees need higher qualifications. The results presented show that digitalization in logistics can be implemented more effectively for employees if qualifications focus more on

information technology factors than has been case so far. New vocational training occupations may also ne necessary in the future, reflecting a shift towards digital competencies in the training programs.

It has become clear from own explanations that HRM itself must continue to develop. This must be achieved by observing and recognising the necessary processes and the demands placed on them as knowledge. By integrating HRM into the company's overall strategy, the necessary personnel requirements can be customised. In addition, it has been shown that existing staff gain greater benefits and resilience through target-orientated training and further education with content aligned to the requirements of the company in a strategic HRM system that is both digitally and practically supported. Furthermore, it is recognised and explained that personnel searches for logistics can be geared towards generalists if the corresponding training and further education measures are adapted to the processes in a results-oriented manner. This enables faster application processes and shorter familiarisation times, which have a positive effect on order processing in logistics.

In order to offer a practical, realisable approach to this, a basis for strategic planning has been created with order-oriented HRM, in which each order is defined as a project and provided with corresponding resource planning. By integrating the resource of personnel, this results in high efficiency in the rapid and precise allocation of personnel in terms of quality and quantity. At the same time, a need for new personnel is recognised at an early stage, which can generate rapid recruitment success with a digital application process for generalists. Further concrete modelling of the framework, which can be created using business process management software, for example, is available for further research. A complete workflow can also be used to model the individual tasks of personnel management and verify their effectiveness.

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Strategic requirements of digitalisation for HRM in the logistics sector

ABSTRACT

Technical developments in the field of digitalisation are creating new opportunities in human resource management (HRM). In the area of distribution and intralogistics, there is a need for optimisation. Until now, personnel decisions almost all qualification levels are often made in HR departments using standardized job descriptions. Decisions are made by HR departments alone and not in consultation with other relevant departments. Necessary and critical success factors, such as requirements for the introduction of technologies in intralogistics for the digitalisation of processes and tasks through robotics and automation projects, are insufficiently or not at all considered in HRM, which must be defined as a research gap. In order to achieve greater efficiency in logistics staffing, companies are required to utilise personnel decisions as part of the corporate strategy. To this end, HRM must be integrated into the company's goal-oriented intralogistics mission statement. System requirements in the company and their fulfilment by a candidate, basic, application-oriented technology knowledge and industry expertise are decisive factors for performance. The aim of this article is to present a target-oriented strategic HRM framework based on the possibilities of digitalised HRM as an adaptation requirement in logistics, which is effective in practice.

KEYWORDS

Strategic human resource management, digitalisation, logistics, project management, intralogistics

JEL CLASSIFICATION

J24; L23; L81; M12; M51; 014; 023