

Gelenekselden Dijitale İnsan Kaynakları Yönetiminin Evrimi: Endüstri 5.0 Sürecinde Küresel Uygulamalar ve Türkiye Perspektifi

From Traditional to Digital Human Resource Management: Global Practices and the Turkish Perspective in the Industry 5.0 Era

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Özet

Bu çalışmanın amacı, İnsan Kaynakları Yönetiminin (İKY'nin) küresel düzeyde ve Türkiye özelindeki tarihsel gelişimini analiz ederek, Endüstri 5.0'in insan merkezli ve teknoloji ile bütünleşmiş yapısının İKY üzerindeki etkilerini araştırmak ve yapay zekâ gibi ileri teknolojilerin İKY politikalarına potansiyel yansımalarını değerlendirerek Türkiye için uygulanabilir stratejiler geliştirmektir. Yöntem olarak nitel araştırma yaklaşımı benimsenmiş ve veri toplama aracı olarak literatür taraması kullanılmıştır. Çalışmada İKY'nin tarihsel gelişimi, Türkiye'deki seyri ve Endüstri 5.0'in etkileri incelenmiştir. Bu sayede kuramsal bir çerçeve oluşturulmuş ve yeni sanayi paradigmasına yönelik öneriler geliştirilmiştir. Sonuç olarak, İKY'nin Endüstri 5.0 sürecinde teknolojik dönüşümün ötesine geçerek insan merkezli, etik ve stratejik bir yapıya evrilmesi gerektiği; Türkiye'de ise bu dönüşümün dijital altyapının yanı sıra kurumsal kültür, liderlik ve toplumsal değerlerle birlikte ele alınmasının gerekliliği ortaya konmuştur. Türkiye henüz Endüstri 5.0 geçişini tamamlamamış olmakla birlikte, bu süreçte diğer ülkelerin deneyimlerinden faydalanma potansiyeli, yeni fırsatların hayata geçirilmesini mümkün kılmaktadır.

Anahtar Kelimeler: İnsan Kaynakları Yönetimi, Endüstri 5.0, Dijital Dönüşüm, Yapay Zekâ, Stratejik İnsan Kaynakları Yönetimi, Sürdürülebilirlik

Abstract

The aim of this study is to analyze the historical development of Human Resource Management (HRM) at the global level and specifically in Türkiye, to examine the effects of the human-centered and technology-integrated structure of Industry 5.0 on HRM, and to develop applicable strategies for Türkiye by evaluating the potential implications of advanced technologies such as artificial intelligence for HRM policies. A qualitative research approach was adopted as the methodology of the study, and a literature review was used as the data collection method. The historical development of HRM, its trajectory in Türkiye, and the impacts of Industry 5.0 were examined. In this way, a theoretical framework was established and recommendations for the new industrial paradigm were developed. As a result, it has been revealed that HRM should evolve beyond technological transformation into a human-centered, ethical, and strategic structure within the Industry 5.0 process. In Türkiye, this transformation needs to be addressed not only through digital infrastructure but also in conjunction with organizational culture, leadership, and societal values. Although Türkiye has not yet completed the transition to Industry 5.0, the potential to benefit from the experiences of other countries during this process makes it possible to implement new opportunities.

Keywords: Human Resource Management, Industry 5.0, Digital Transformation, Artificial Intelligence, Strategic HRM, Sustainability

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1. INTRODUCTION

Human Resource Management (HRM) is not merely a product of the modern era; rather, it is a structure that has emerged through thousands of years of accumulation, institutionalization, and the evolution of social organizations. However, its transformation into a systematic and scientific field in the contemporary sense became possible particularly in the post-Industrial Revolution period. In this context, it is important to address historical development not only from a Western-centered perspective but also by including earlier civilizations (Orhan, 2010).

Although the historical development of HRM is difficult to periodize with sharp boundaries due to complex social realities, it can generally be examined within three main periods: the pre-Industrial Revolution period, the post-Industrial classical period, and the modern period. While various practices related to human management existed throughout history, it is observed that the theoretical foundations of HRM were largely shaped in the post-Industrial Revolution period, particularly through studies centered in the United States (Man, 2024:105–108).

The Industrial Revolutions that began in the second half of the 18th century in the United States and England constituted one of the most significant turning points in human history by leading to profound transformations not only in production methods but also in social structures, labor-employer relations, and management approaches (Berктаş, 2021:2). The First Industrial Revolution, initiated by the invention of the steam engine, triggered the transition from an agricultural and feudal societal structure to an industry-based capitalist system, resulting in the redefinition of human labor in the face of mechanization (Kılıç, 2023:278).

This transformation, which began with the First Industrial Revolution, deepened further with subsequent industrial revolutions; technological innovations led to significant changes not only in production methods but also in working relations and workforce qualifications (Atahan, 2010). Initially, when mechanization was at the forefront, the primary objective was to produce more with fewer resources (Davutoğlu, 2020). Consequently, human beings, who were initially regarded merely as a factor of production, gradually began to be viewed as a fundamental element of organizational success. However, during this period, an HRM understanding in its contemporary sense had not yet emerged (İstanbul İşletme Enstitüsü, 2019).

Today's sustainable HRM approach has been shaped through the interaction of various disciplines such as economics, psychology, sociology, industrial relations, behavioral sciences, and law. This multidimensional development process has evolved from the pre-traditional period through classical approaches such as Welfare Secretaryship and Personnel Management, into Strategic, Sustainable, and Electronic HRM models that emerged under the influence of globalization and technological transformation (Yılmaz, 2023). Although technology has become an important component of HRM in today's working life, where artificial intelligence applications are rapidly expanding, the human factor still plays a decisive role in enabling organizations to gain competitive advantage. In this context, Industry 5.0, referred to as the Fifth Industrial Revolution, is shaped by advanced technologies such as artificial intelligence and the Internet of Things, and is expected to produce deep and multidimensional impacts not only on production processes but also on human-centered management approaches, thereby influencing the future of humanity (İnce et al., 2021).

In recent years, the concepts of Industry 5.0 and the parallel notion of Society 5.0 have emerged, offering a human-centered and sustainable transformation vision beyond technological advancement. Defined by the European Commission as a "sustainable, resilient, and human-centric" industrial model, Industry 5.0 is based on the collaboration between innovative technologies such as artificial intelligence, the Internet of Things, biotechnology, and robotics with human labor. This situation highlights the

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inadequacy of traditional HRM practices and necessitates the development of new strategies that enable organizations to respond simultaneously to both digitalization and human-centeredness (Huang et al., 2022).

This study aims to examine the historical development of HRM at both the global level and within the Turkish context and to analyze the effects of the human-centered and technology-integrated structure of Industry 5.0 on HRM. By evaluating the potential implications of advanced technologies such as artificial intelligence on HRM policies, the study seeks to develop applicable strategies within the Turkish context. Thus, beyond providing a historical background, this research presents a multi-layered and comparative analysis of how HRM should transform in line with the expectations of Industry 5.0. In this respect, the study contributes to the academic literature while also offering a strategic roadmap for practitioners and policymakers.

Research Questions

In line with the conceptual and analytical scope of the study, the following research questions were addressed:

- How has the historical development process of human resource management evolved within the context of different industrial paradigms?
- How do advanced technologies such as artificial intelligence, automation, and digitalization transform the role, functions, and strategic position of HRM within the framework of Industry 5.0?
- What structural, institutional, and cultural transformations are required for HRM practices in Türkiye to adapt to the Industry 5.0 vision?

2. METHODOLOGY

This study was designed within the framework of a qualitative research approach and is based on a descriptive and analytical literature review. The primary aim of the research is to examine the historical development of Human Resource Management (HRM) at both the global level and within the Turkish context, and to conceptually analyze the transformations emerging in the context of Industry 5.0. Accordingly, rather than employing methods based on quantitative data production, a qualitative method was preferred, as it enables the exploration of theoretical depth and historical continuity.

2.1. Data Sources

The data used in this research were obtained from secondary sources. In this context, national and international peer-reviewed journal articles, books, doctoral dissertations, policy reports, and official institutional publications related to Human Resource Management, industrial revolutions, Industry 5.0, and Society 5.0 were examined. In particular, Industry 5.0 reports published by the European Commission, along with recent studies focusing on digital transformation, sustainability, and human-centered management approaches, constituted the primary data sources of the research.

In order to increase the transparency and reliability of the literature review, the search process was conducted through several national and international academic databases, including Google Scholar, DergiPark, Scopus, Web of Science, and the Council of Higher Education Thesis Center. The literature search covered the period between 2010 and 2025, with particular attention given to studies published in recent years due to the emerging nature of the Industry 5.0 paradigm. During the review process, combinations of keywords such as “Human Resource Management,” “Personnel Management,” “Strategic Human Resource Management,” “Industry 5.0,” “Society 5.0,” “digital transformation,” “artificial intelligence in HRM,” “sustainability,” were used. The inclusion of these databases, time

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boundaries, and search terms aimed to ensure a more systematic, traceable, and reliable review process in line with the requirements of qualitative research.

2.2. Data Analysis Method

The collected data were evaluated using thematic content analysis and historical-comparative analysis methods. Within this framework, the historical development of HRM was classified according to different industrial paradigms, and the human-centered, ethical, and sustainable HRM approaches that have come to the forefront with Industry 5.0 were analyzed under specific thematic categories.

2.3. Validity and Reliability

In order to enhance the validity of the research, numerous academic and institutional sources from different disciplines and time periods were consulted, and the findings obtained were evaluated comparatively. To ensure reliability, the analysis process was conducted in a transparent and systematic manner, and the concepts and classifications used were based on well-established definitions in the literature. Furthermore, to minimize interpretive subjectivity, the conclusions were directly linked to findings in the literature, and personal evaluations were avoided.

3. THE HISTORICAL DEVELOPMENT OF HUMAN RESOURCE MANAGEMENT IN THE WORLD

3.1. The Pre-Industrial Revolution Period

Prior to the Industrial Revolution, the management of human resources was largely conducted under the guidance of political and religious authorities, relying on intuition and experience rather than systematic approaches. In Ancient Greece, philosophers such as Socrates and Aristotle proposed universal principles related to governance and administration, while in Rome, merit and competence were emphasized in public administration. In Egypt, a theocratic order prevailed, whereas in Byzantium, centralized bureaucracy dominated administrative practices. In the Ottoman Empire, human resource classification was structured under the categories of “Mülkiye” (civil administration), “Seyfiye” (military class), “İlmiye” (religious-judicial class), and “Kalemiye” (bureaucratic scribal class), which constituted some of the earliest institutional examples of personnel management.

Although it is not possible to speak of a systematic Human Resource Management (HRM) approach in the modern sense during these periods, significant institutional and conceptual foundations were established in terms of the evolution of management thought (Acar, 2020; Armağan, 2011; Geanakoplos & Alican, 2011; Kurt et al., 2016). Many practices that later aligned with modern management theories—such as Henri Fayol’s universal principles of management and Max Weber’s rational authority approach—were shaped during these early periods (Özer & Çiftçi, 2022). In this context, the reflections of personnel management approaches across different civilizations can be classified as follows:

3.1.1. Ancient Greek Period

In Ancient Greece, the concept of human management was addressed at a philosophical level, and philosophers such as Socrates and Aristotle developed universal principles related to governance and administration. The managerial virtues, individual competence, and the principle of public benefit articulated in Aristotle’s works *Ethics* and *Politics* constitute the philosophical foundations of the modern concept of meritocracy. During this period, the classification of the educational system into the Trivium (grammar, logic, rhetoric) and Quadrivium (arithmetic, geometry, astronomy, music) represents an early example of knowledge- and competency-based human resource planning (Acar, 2016; Urhan, 2016).

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3.1.2. Ancient Egyptian Period

In Ancient Egypt, where a theocratic structure prevailed, administrative processes were carried out through pharaohs and priests who were identified with divine authority. The management and direction of human resources relied on the knowledge and administrative capabilities of the priestly class within the temple-based economy. This structure prioritized legitimacy based on belief rather than rationality as the primary source of authority (Çiçek, 2018).

3.1.3. Roman Empire Period

The Roman Republic period represents a political structure in which citizen participation in governance was institutionalized. During this period, the right of citizens to elect their leaders and the determination of laws regulating public life by the people laid the foundational principles for contemporary concepts of republic and democracy. Traditionally based on customs and traditions, Roman law was codified during the Republic under the influence of political, social, economic, and legal dynamics. The structure of public administration was generally shaped according to principles of competence and merit, with appointments carried out by the Senate based on individuals' education, contributions to society, and military achievements. With Augustus' transition from the republican system to the imperial regime in 27 BCE, the Senate—comprising aristocrats and serving effectively as an advisory body to the emperor—gained prominence. Appointments of provincial governors, military commanders, and high-ranking officials in the territories under Roman control were conducted by this council. Moreover, Rome's legion system provided a pioneering model for the disciplined, task-oriented, and functional management of human resources within an organizational framework (Kaya, 2005; Küçük, 2017; TÜBA Açık Ders Malzemeleri, 2025).

3.1.4. Byzantine Period

In the Byzantine Empire, HRM was conducted through a centralized and aristocratic bureaucracy. Society was divided into rigid classes, and the duties of each class were defined according to strict regulations. This structure reflects an early form of the “rational-legal authority” concept articulated in Max Weber's definition of bureaucratic authority (Kadioğlu & Altay, 2023; Togaç, 2025).

3.1.5. The Periods in Which the Prophets Lived

Throughout different periods of history, the principles of human management conveyed in the messages of prophets were generally shaped within the framework of moral values. Persuasion, compassion, justice, merit, selflessness, and the balance of authority and responsibility are emphasized in these teachings. This approach can be related to contemporary theories of ethical leadership and participatory management (Baysal, 2025).

For instance, following the establishment of the Medinan city-state, the Islamic Prophet Muhammad (peace be upon him) appointed individuals to various positions to ensure the functioning of the state and the execution of public affairs. His adherence to principles of competence and merit in these appointments ensured that the practices were accepted by the community without objection or dispute (Yılmaz, 2018).

3.1.6. Ottoman Empire Period

In the Ottoman Empire, HRM was institutionalized through a class-based structure. Operating through four principal classes—Mülkiye (administrators), İlmiye (religious scholars and judiciary), Seyfiye (military class), and Kalemîye (bureaucrats)—this system can be regarded as one of the earliest systematic examples of personnel management in terms of task definition and the separation of authority and responsibility. It can be argued that this structure, with its rationalized division of labor and principles of institutional loyalty, anticipated Max Weber's model of bureaucracy (Akçakaya, 2016;

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Eroğlu, 2016; Hacitalipoğlu, 2019).

The ideas of Mevlânâ Celaleddin-i Rûmî, who lived in the 13th century and was active in Anatolia on the eve of the establishment of the Ottoman State, were particularly transmitted by the Ottoman İلميye class and continued for centuries. According to Mevlânâ, the maintenance of justice, peace, and prosperity in society depends on appointments being based on merit and competence. Assignments made without consideration of expertise and experience would disrupt social order and hinder the progress of the state. Mevlânâ conceptualized merit as a combination of knowledge, experience, and virtue, viewing it not as an innate privilege but as a quality acquired through education and effort. In this context, he also considered it reasonable for well-equipped young individuals to be appointed to high-ranking positions. Furthermore, he emphasized that leaders should benefit from competent and meritorious advisors (Ergül, 2017; Öngören, 2007).

In conclusion, although human management in the pre-Industrial Revolution period relied largely on intuitive, hierarchical, and value-based structures, many of the conceptual and structural foundations of contemporary HRM were established during this historical process. This indicates that HRM is not merely a technical field belonging to modern industrial societies but rather a multilayered discipline with a historical, cultural, and theoretical background. A summary of the key points discussed above is presented in the table below.

Table 1. Human Resource Management Understanding in the Pre-Industrial Revolution Period

Period	Personnel Management Understanding
Ancient Greece	Universalism and scientific thinking dominate the management philosophy of Socrates and Aristotle.
Ancient Egypt	Theocracy; priests are at the forefront of decision-making processes.
Rome	Senate and military organizations making appointments based on competence and merit.
Byzantium	Aristocracy, bureaucracy.
Periods of the Prophets	Human management prioritizing persuasion, love, justice, merit, self-sacrifice, authority, and responsibility.
Ottoman Period	Mülkiye (high-level administrators and commanders), İلميye (religious, judicial, and educational officials), Seyfiye (soldiers other than commanders), Kalemiye (other civil servants).

Source: Created by the authors

3.2. Theoretical Evaluation of the Classical Period After the Industrial Revolution

Although the historical classification of HRM from the Industrial Revolutions to the present may vary according to different perspectives, it is more meaningful when linked to a theoretical framework. Broadly, the historical trajectory begins with the pre-traditional period, encompasses the Welfare Secretaryship and Personnel Management (PM) era, and extends to the modern period dominated by Strategic, Sustainable, and Electronic HRM approaches influenced by globalization and rapid technological advancements. This evolutionary process reflects not merely a chronological progression but also the contributions of multidisciplinary fields such as behavioral sciences, economics, psychology, sociology, industrial relations, and law (Alanlı, 2022:53).

The development of the theoretical foundations of HRM can be explained through contributions

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from various social science theories. Maslow's Hierarchy of Needs provides an essential theoretical basis for understanding employees' intrinsic motivation, while Herzberg's Two-Factor Theory guides the analysis of the relationship between job satisfaction and productivity (House & Wigdor, 1967; Trivedi & Mehta, 2019). McGregor's Theory X and Theory Y elucidate how managers' assumptions about human nature influence their management styles. Collectively, these theoretical approaches demonstrate that HRM is not merely a technical domain but also encompasses psychological and sociological dimensions (Russ, 2011).

The historical evolution of management thought has directly influenced the transformation of HRM. Max Weber's bureaucracy theory left profound effects on organizational structures through principles of rationality and hierarchy, whereas Frederick Taylor's Scientific Management advocated for the systematic organization of work processes (Taneja et al., 2011; Udy, 1959). Elton Mayo's human relations approach, grounded in the Hawthorne Studies, highlighted the impact of social interactions on productivity within organizations, giving rise to the notion that HRM should be structured in a manner sensitive to psychological needs (Ekinci, 2019).

With Industry 4.0, technologies such as digitalization, automation, big data, and artificial intelligence fundamentally transformed the nature of work processes, necessitating restructuring within HRM practices. However, Industry 5.0 goes beyond digitalization, foregrounding a human-centered approach. The European Commission's characterization of Industry 5.0 as "sustainable, resilient, and human-centric" indicates that this transformation represents not merely a technical revolution but also a social and ethical paradigm shift. This new perspective requires comprehensive restructuring in HRM, encompassing areas such as employee well-being, participation, and competency development (Teoman, 2024).

3.3. The Classical Period after the Industrial Revolution

The Industrial Revolutions, which began in the second half of the 18th century in the United States and the United Kingdom, influenced not only global economic systems but also the field of management science, gradually laying the groundwork for the emergence of strategic areas such as Human Resource Management (HRM). Throughout history, the Industrial Revolutions fundamentally transformed not only production methods but also labor-employer relations, social structures, and management practices (Kılıç, 2023). For instance, under the Fordist production model, the workforce became more standardized, repetitive, and controllable. However, from the mid-20th century onwards, particularly under the influence of the human relations approach and behavioral sciences, the motivational, satisfaction, and developmental dimensions of the human factor gained prominence (Saklı, 2013:109,117).

The concept of human resources was first introduced globally in the 1960s and in Türkiye during the 1980s. Since that time, HRM has evolved into a multidimensional discipline that places the human factor at the center of achieving organizational strategic objectives, aiming to enhance organizational efficiency through practices such as planning, recruitment, training, performance management, and motivation. Initially considered an operational function, HRM gradually assumed a strategic role, becoming a decisive factor in enabling organizations to attain competitive advantage (Eroğlu, 2016:182). A summary of the key points discussed above is presented in the table below.

Table 2. Human Resource Management from the Beginning of the Industrial Revolution to the Modern Period

1st Industrial Revolution (1760–1830)	Establishment of vocational organizations
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2nd Industrial Revolution (1870–1913)	Emergence of employment offices and welfare secretaries
1900 - 1960	Personnel administration, personnel management, and industrial relations

Source: Created by the authors.

3.4. Modern Period: Strategic and Sustainable Approaches

The differentiation of Human Resource Management (HRM) from classical personnel management and its establishment as an independent and holistic field became possible in the 1960s with the contributions of behavioural sciences. During this period, the human factor began to be viewed not as a cost element but as a fundamental resource providing strategic advantage to the organization. This perspective, which emphasized psychological dimensions such as employee commitment, motivation, and organizational citizenship, evolved into a Strategic HRM approach after the 1980s under the influence of globalization, technological advancements, and increasing competition. Within this framework, the human factor was considered not merely as a production input but as a key determinant of organizational success (Alanlı, 2022).

Subsequently, the sustainable development approach initiated by the United Nations' 1987 Brundtland Report also transformed HRM, introducing the "Sustainable HRM" model, which emphasizes environmental sensitivity and adherence to ethical values (Çalık, 2016). From the 1990s onwards, Electronic HRM practices developed alongside digitalization, and in the contemporary context of Industry 5.0, a "human-centered, flexible, and technology-integrated" HRM approach has become inevitable (Doğan, 2011). A summary of the key points discussed above is presented in the table below.

Table 3. HRM from the Industrial Revolution to the Modern Period

Year	Personnel Management Understanding
1960–1980	HRM
1980	Strategic HRM
1987	Sustainable HRM
1995	Electronic HRM

Source: Created by the authors.

Table 4. Comparative Table of Personnel Management and HRM

PM (Personnel Management)	HRM (Human Resource Management)
Short-term	Long-term
Obedience	Commitment to the workplace
Control	Self-control
Low trust	High trust
Bureaucratic	Flexible
Centralized structure	Decentralized authority

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PM (Personnel Management)

HRM (Human Resource Management)

Cost

Maximum benefit from employees

Source: Created by the authors.

4. THE HISTORICAL DEVELOPMENT OF HUMAN RESOURCE MANAGEMENT IN TÜRKİYE

4.1. The Historical Development of Human Resource Management in Türkiye

The development of Human Resource Management (HRM) in Türkiye underwent a significant transformation following the proclamation of the Republic. The personnel system, which during the Ottoman period was maintained through a centralized and class-based structure, evolved in the Republican era into a modern public administration framework and, with the growth of the private sector, adopted a more strategic and human-centered approach. Historically, the HRM paradigm in Türkiye can be examined across four main periods:

The first period, the Single-Party Era between 1923 and 1946, established fundamental structures such as regulations concerning civil servants, labor laws, and the pay scale system. The second period, from 1947 to 1962, is characterized by the pronounced influence of the United States; institutions such as the Marshall Plan, TODAİE, and METU played significant roles in shaping HRM practices. The third period, 1963–1980, referred to as Professionalization and Transformation Amidst Turbulence, witnessed the strengthening of labor unions, the establishment of personnel management departments, and the introduction of behaviourally-based approaches in universities. The fourth period, extending from 1981 to the present, represents the Transformation in Human Resource Management, marked by legal reforms in line with EU harmonization, the emergence of sustainable HRM practices, and the redefinition of the profession (Eroğlu, 2016). A more comprehensive summary of the aspects outlined above is presented in a table by Eroğlu (2016).

Table 5. Human Resource Management in Türkiye

Period	Characteristics of the Period
1923–1946 Single-Party Period	Laying the institutional foundations; in the early years of the Republic, a centralized structure focused mainly on the public sector. Personnel management was shaped around administrative loyalty and continuity of public service. In 1926, Law No. 788 on Civil Servants, in 1929, the salary-grade application established by Law No. 1452, and in 1936, Labor Law No. 3008 came into force.
1947–1962 Period under American Influence	Structural transformations in HRM through technical and administrative consultancy support received from the United States within the scope of the Marshall Plan; Law No. 5434 establishing the Turkish Retirement Fund in 1949; HRM courses through TODAİE established in 1952; public administration professionalization courses pioneered by METU in 1957; clearer distinction between public and private sectors; an effort toward professionalization centered on education and merit; a more systematic personnel management structure through the establishment of the State Personnel Department in 1960; adoption of a modern public administration approach.

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Period	Characteristics of the Period
1963–1980 Transformation and Professionalization Process	Institutionalization following the 1961 Constitution, which brought social rights under constitutional guarantee; labor unions gaining legal ground and strength; the establishment of chairs of Behavioural Sciences and Personnel Management in universities; enactment of key legal regulations such as the Labor Law, Trade Unions Law, and the Law on Collective Bargaining, Strike, and Lockout.
1981–Present Restructuring and Transformation Process	HRM has transformed into a strategic discipline under the influence of globalization, neoliberal policies, EU harmonization, and technological developments after 1980. Since 2020, its focus has shifted toward human-machine collaboration, digital ethics, continuous skill development, and employee experience. In Türkiye, this transformation has been supported by public policies on digital literacy, AI-related skills, and remote work, as well as private-sector practices such as HR analytics, agile HR, and organizational climate improvement, in line with the Industry 5.0 vision.

Source: Created by the authors.

4.2 Examples from Türkiye and The World: Transformation in Human Resource Management Strategies After Industry 5.0 (Society 5.0)

The concept of Industry 5.0 has begun to be implemented by numerous enterprises beyond its theoretical framework. In this process, HRM is developing new strategies that integrate human capabilities with technological systems (Çetin, 2021). Below, selected examples from Türkiye and around the world are presented to illustrate how this transformation is reflected in practice.

4.2.1. Siemens (Germany): HRM Focused on Human–Machine Collaboration

Siemens, one of the pioneering organizations adopting a human-centered digital production approach in the transition to Industry 5.0, draws attention with its strategic practices in this field. At the company’s production center in Amberg, Germany, a production model is being developed in which artificial intelligence and robotic technologies are integrated into a symbiotic relationship with employees. In parallel with this transformation, Siemens’ HRM strategies are based on the continuous development of employees’ competencies. In this context, continuous training programs are offered to employees in order to equip them with digital competencies such as data analytics, artificial intelligence algorithms, and robotic programming. In addition, “reskilling” programs are implemented to facilitate the adaptation of the workforce to the digitalization process, and traditional production workers are transformed into digital production specialists. Furthermore, employee well-being is also addressed as a primary strategic goal through practices such as flexible working hours and ergonomic production processes; in this way, technology-oriented production processes are redesigned in harmony with human needs (Siemens, 2019, 2024).

4.2.2. Arçelik (Türkiye): Digital Factories and Talent Management

Arçelik, one of the leading companies in Türkiye that has adopted and implemented the principles of Industry 4.0, addresses the digital transformation process not only at the level of technological infrastructure but also comprehensively from the perspective of HRM. While digital twin technology, Internet of Things (IoT) systems, and robot-assisted production models are used effectively in its production facilities, an HRM strategy compatible with these technological innovations has also been developed. Arçelik’s HRM approach is shaped around a focus on “future competencies”; accordingly, employees are provided with continuous training opportunities in areas such as data

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analytics, machine learning, and digital leadership. In addition, not only technical knowledge and skills but also digital adaptation capacity and analytical problem-solving ability are prioritized in recruitment processes. In order to adapt to the flexible and collaborative work models required by Industry 4.0, career development planning is structured in line with horizontal and project-based organizational systems rather than traditional hierarchical structures. Thus, Arçelik aims to achieve sustainable competitive advantage by integrating its human-centered digitalization approach into both production processes and HRM policies (Yoşumaz & Özkara, 2022:35,41,42,43).

4.2.3. Hitachi (Japan): HRM Integrated with Society 5.0

As a pioneer of the Society 5.0 approach in Japan, Hitachi has deepened digital transformation by integrating advanced automation systems with human beings in production processes. This transformation is not only a technological innovation but has also undergone a significant evolution from the perspective of HRM. Hitachi has transformed its HR departments from the traditional understanding of personnel management into “human experience management” units. This change aims not only to measure and improve employees’ productivity but also their life satisfaction. In the company’s HRM strategy, elements such as flexible working policies, AI-supported workload distribution, and personal development support programs are integrated so that both the physical and mental well-being of employees are prioritized. In addition, employees’ suggestion systems are matched with AI algorithms, thereby enabling participation in decision-making processes and implementing the principle of “participatory artificial intelligence.” Through these strategies, Hitachi shapes not only its workforce but also its organizational culture in accordance with the digital age by placing employee experience at the center (Hosogaya, 2021; Akman, 2023).

Table 6. Industry 5.0 HRM Strategies of Siemens, Arçelik, and Hitachi

Company	Digital Technologies	HRM Strategy	Technologies Integrated into HRM	Career Development Policies
Siemens	Artificial intelligence, robot technologies, digital twin, Internet of Things	Continuous training in data analytics, artificial intelligence algorithms, and robotic programming; workforce reskilling programs; flexible working hours and ergonomic production processes	Artificial intelligence, robot technologies, digitalization	Horizontal and flexible career development, skill development compatible with digitalization
Arçelik	Digital twin, Internet of Things, robot-assisted production	Training focused on future competencies (data analytics, machine learning, digital leadership); recruitment based on digital adaptation and problem-solving capacity; horizontal and project-based career development plans	Digitalization, artificial intelligence, data analytics	Horizontal and project-based career development plans, acquisition of digital competencies

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Company	Digital Technologies	HRM Strategy	Technologies Integrated into HRM	Career Development Policies
Hitachi	Advanced automation, artificial intelligence, robot technologies	Transformation into human experience management units; measurement of life satisfaction and productivity; flexible working policies; AI-supported workload distribution; personal development support	Artificial intelligence, automation, employee suggestion systems	Human experience-oriented career planning, employee life satisfaction

Source: Created by the authors.

The examples above clearly demonstrate that Industry 5.0 requires not only technological innovations but also a human-centered cultural transformation. The common strategies underlying this transformation enable businesses to position HRM not merely as an operational function but as a strategic partner. Continuous skill development and reskilling training are among the most critical elements for increasing employees' competencies in a rapidly changing digital environment. Furthermore, the integration of digital literacy and technological adaptability into recruitment and performance evaluation systems plays an important role in shaping organizations' future workforce strategies. In addition, the inclusion of psychosocial factors such as employee well-being, the search for meaning, and work-life balance in HRM processes ensures that employees are evaluated not only from a productivity perspective but also in terms of personal satisfaction and life fulfilment. This holistic approach contributes to shaping Industry 5.0 as a strategic transformation that supports harmonious interaction between human beings and technology (Gür et al., 2019).

5. LIMITATIONS OF THE STUDY

This study has several limitations. First, the research is limited to a qualitative and literature-based method, and empirical data collection techniques such as field research, surveys, interviews, or case analysis were not used. This limits the generalizability of the findings.

Second, since the concept of Industry 5.0 is relatively new and still developing, academic studies in this field are limited in number. In this context, the analyses are based mainly on conceptual studies, policy documents, and pioneering application examples.

Third, HRM practices in Türkiye were addressed at the macro level, while sectoral, firm-size, and regional differences were not analyzed in detail. This restricts the capacity of the findings to reflect organizational differences at the micro level.

Finally, the effects of artificial intelligence and digital technologies on HRM were evaluated mostly within the framework of potential trends and projections, and no conclusions were drawn based on long-term empirical results. In future studies, the use of quantitative or mixed methods may contribute to deepening and testing the findings obtained in this research.

6. DISCUSSION AND CONCLUSIONS

This study aimed to analyze the historical development of HRM both globally and in the context of Türkiye, while examining the new orientations introduced by Industry 5.0 from a multidimensional perspective. The findings show that HRM has historically evolved from being a function focused solely

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on increasing organizational efficiency into one that is restructured in line with technological developments, sociocultural transformations, and ethical principles. In particular, the evolution of HRM into hybrid structures based on human-machine collaboration under the influence of artificial intelligence and digitalization reveals that this transformation is not only technological but also strategic and human-centered.

With Industry 5.0, HRM is transforming into more human-centered, flexible, and ethically grounded structures, unlike the classical understanding of personnel management. It is anticipated that in the future HRM will become a strategic partner for organizations, be more actively involved in top management processes, contribute to the development of intellectual capital, increase employee participation, undergo a transformation toward the service sector, support the transition to next-generation working models, and evolve in line with the requirements of the digital age (Çelik & Başol, 2022).

Türkiye has not yet fully caught up with global trends in industrialization stages, and the process of transferring jobs to artificial intelligence and robots has not yet been fully realized (Alkin, 2017). The level of digital maturity of industry in Türkiye generally lies between I2.0 and I3.0; however, regardless of the stage, the importance of transitioning to I5.0 is emphasized. While this process is observed to progress rapidly especially in large-scale enterprises, progress is slower among small and medium-sized enterprises (SMEs) due to deficiencies in infrastructure, training, and awareness (Duman, 2021). This situation indicates that the HRM transformation is not homogeneous and therefore requires the development of different strategies on a sectoral and scale basis (Esen & Özer, 2020).

From a comparative perspective, the transformation of HRM in the Industry 5.0 era can be observed more clearly through selected European examples and the Turkish context. In Germany, this transformation is closely associated with vocational training, reskilling, and workforce adaptation to advanced production systems. In the United Kingdom, the debate has focused more on the responsible use of AI in recruitment and HR processes, especially in terms of fairness, accountability, and employee rights. In France, the balance between digital transformation and social protection has become a central issue, particularly in relation to job quality and employee well-being. Compared with these examples, Türkiye is still in a transitional stage; however, the growing Turkish literature on digital transformation, sustainable HRM, and competency development suggests that Türkiye has significant potential to build a more human-centered and strategic HRM model in the Industry 5.0 era (European Commission, 2021; OECD, 2025; Department for Science, Innovation and Technology, 2024; Kırılmaz & Efe, 2020).

On the other hand, although AI-supported recruitment and evaluation systems have the potential to increase organizational efficiency, issues such as data security, algorithmic bias, and ethical transparency pose serious risks (Tonbil & Aksakal, 2024). Therefore, by evaluating the historical development of HRM within an interdisciplinary framework, the Industry 5.0 process should be addressed as a holistic analysis encompassing not only technological but also ethical, psychological, and cultural dimensions. In the case of Türkiye, it should be taken into account that the digitalization process is shaped not only by technological investments but also by organizational culture, leadership styles, and social values.

In this context, the principles of competence and merit are among the most fundamental principles that should be taken into account throughout employment processes, regardless of whether the sector is public or private. Critical indicators such as the prestige of institutions and organizations, the preservation of brand value, and the sustainability of investment profitability are directly related to qualified HRM, which is defined as intellectual capital. In this respect, merit-based HRM policies not only increase internal productivity and efficiency but also contribute to the establishment of social justice (Özçelik & Yılmaz, 2019). Therefore, both public and private sector actors should adopt fair,

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transparent, and merit-based approaches in HRM and develop employment policies accordingly, thereby contributing to long-term institutional success and a climate of social trust.

Future research may deepen the analysis of HRM practices in different sectors through comparative case studies and empirically examine employees' perceptions, concerns, and expectations regarding digitalization. In addition, the relationship between the digital transformation levels of enterprises of different sizes in Türkiye and their organizational performance can be investigated through data-based analyses.

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