



# Expert Systems in HRM : A Digital Construction

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**Abstract:** The main objective of this research is to carefully describe the role of Expert Systems (ES) in human resource management discourse. What logical constructs must be built when there is a desire to empower the capabilities of computational expert systems in their pragmatic use. Human Resource Expert Systems (HRES) can mimic the decision-making capabilities of a Human Resource Expert (HRE). The design and development of HRES depends on top management initiative and support. The implementation of HRES should be holistic, with maximum participation from all departments in the organization. This study uses a qualitative descriptive method, with a literature study approach. The main data is drawn from a variety of selected journal papers, taken from reputable journals. Other sources that are compatible with the research, such as news, academic papers, videos and other documents. The study found that there is a challenge to reduce the fear of computers in HR functions and resistance to change. HRES can increase productivity levels by assisting HR managers in making rational decisions to solve unstructured HR related problems. The emphasis is on organizational change and bold initiatives to further implement ES in the HR domain and overcome challenges. This paper aims to analyse the focus areas of HRES and the functions where HRES faces limitations and challenges.

**Keywords:** Digital Construction; Expert Systems; HRM

## Introduction

Expert system (ES) is a field within Artificial Intelligence that has now been around for several decades (Sulartopo et al., 2023; Wagner, 2017). Since its inception in the 1970s and its rise to popularity in the 1980s and 1990s, many case studies have been published containing a wealth of knowledge about what worked and what did not work for that particular application of think (IoT) is a media that is used in various systems with the use of internet media, all data (Buccieri et al., 2020). Not only have the tools that human resource professionals use changed, of late, so has the role that human resource management plays in the business.

Today, the function is often referred to as a business partner an equal and necessary function responsible not only for the acquisition, retention, and well-being of a talented work force, but also accountable for a contribution to the firm's bottom line, its profits (Hannon et al., 1990). An ES is an intelligent computational program that emulates the decision-

making ability of a human expert (Bharti et al., 2020; Buccieri et al., 2020; Liebowitz, 2019; Olabanji et al., 2023). It is an artificial intelligence technique that extensively uses specialized knowledge to solve complex problems, with intellectual performance comparable to that of a human expert in a specific domain (Buccieri et al., 2020).

In this discourse, the use of expert systems is increasingly widespread, reaching into various fields, for example, the field of human resources (Adamczyk et al., 2020). Efficient human resource management needs accurate assessment and representation of available competences as well as effective mapping of required competences for specific jobs and positions (Kipper et al., 2021). In this regard, appropriate definition and identification of competence gaps express differences between acquired and required competences.

Using a detailed quantification scheme together with a mathematical approach is a way to support accurate competence analytics, which can be applied in a wide variety of sectors and fields (Bohlouli et al., 2017).

### How to Cite:

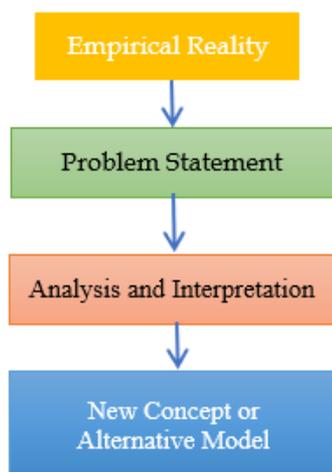
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Furthermore, this study will discuss how digital construction in the use of technological facilities called expert systems for HR management. This short paper will discuss in the theoretical framework model.

**Method**

The methods used in this research can be explained narratively and graphically as described below. The explanation of the research method is carried out in a certain order according to the logic flow of the researcher in translating reality into something that is a proposed solution. It can be state as qualitative method, with literature review approach.

Qualitative methods mean for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Asenahabi, 2019; Kamal, 2019). The process of research involves emerging questions and procedures. data typically collected in the participant's setting data analysis inductively building from particulars to general themes and the researcher making interpretations of the meaning of the data (King, 1991).



**Figure 1.** Research Method Flow

This research uses qualitative methods by reading previous research, by exploring journals that conduct similar research and reading many books that discuss research like this, qualitative methods by also conducting discussions with various parties who understand this research (Creswell & Creswell, 2018).

**Result and Discussion**

*Logic Reason*

One key technological development with a likely profound impact on manufacturing is Cyber-Physical Systems (CPS). These entail the convergence between the physical and virtual industrial environments by

means of business networks that integrate equipment, production, and inventories. They can also be defined as collaboration systems between entities with online and intensive connection with the physical environment and ongoing process in order to provide simultaneous access to data processing dedicated to decision-making (Buccieri et al., 2020).

CPS's are constituted by micro components capable of controlling sensors and actuators to collect and allow data exchange between computers, cable or wireless networks or even with cloud-based servers. The complexity, dynamic behavior, and integration promoted by CPS's are capable to collaborate with planning, analysis, simulation, implementation and maintenance of high-performance manufacturing systems (Buccieri et al., 2020).

The concepts of "digital employees", "digital natives", "net generation", "millennial", is assumed that the early, intimate and enduring interaction with digital technologies has shaped a new generation of people with distinctively different attitudes, qualifications, behaviours and expectations. It is obvious that HRM should react to such changes and align its strategies and activities to this new job market cohort, and search for adequate ways to recruit, to develop, to compensate etc such digital employees and moreover to integrate them with previous generations of employees (Bhanu Prakash et al., 2019).

The challenge for HRM therefore is to identify actual digitally induced changes in attitudes, qualifications, behaviours and expectation of younger employees, while yet avoiding any stereotyping and considering heterogeneity of actual changes. Based on this, the strategies and operative adaptation of HRM to a changing workforce constitutes a step necessary to support organizations further on. In this way, "digital employees" constitute a first notable area of digital changes and challenges of the HRM profession (Bhanu Prakash et al., 2019).

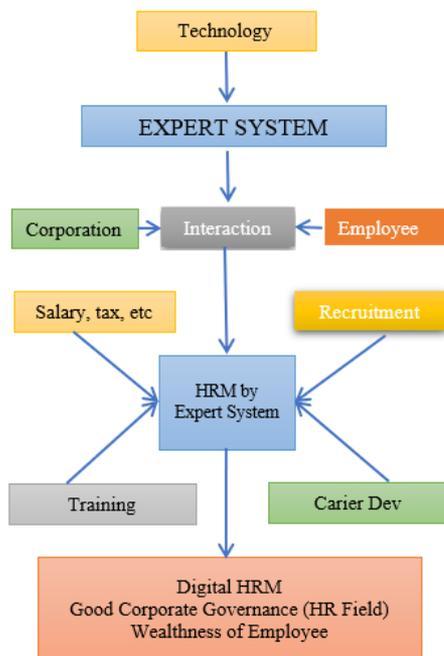
The organizational factors that determine the success of the HRM digitalization can be grouped into two main categories: organizational characteristics and, capabilities and resources. From the study conducted by Kaushal et al. (2023), it emerges that the type of approach to digitalization of HRM adopted by organizations and its success are strongly influenced by the size, sector, business area and geographic area in which the company operates (Maria, 2020).

The size of organizations appears to be positively correlated to digitalization. In fact, digital transformation is more widespread in medium and large organizations. Mishra, analyzing some Indian organizations, highlighted that the private sector is able to better exploit the advantages deriving from the

digitalization of HR practices, compared to public sector organizations (Maria, 2020).

*Construction of Logical Thinking of ES at HRM*

Digitalization of HRM practices also leads to an improvement in efficiency. In particular, many of the studies analyzed underlined that the digitalization of HRM has resulted in time savings. This results in an increase in the productivity of the HRM function. Dionne Démeijer (2017), highlights that thanks to digitalization, HRM processes are simplified, simpler and faster. This allows HR professionals to better focus on activities that are meaningful to their function (Maria, 2020).



**Figure 2.** Design of HRM by Expert System Approach

Private Sector employers of labour should have in place where none in existence a codified training and development policy that would serve as a guide to staff training and development in the organizations (Bakare, 2020). The term digital HR can be understood as integrating social, mobile, analytics and cloud (SMAC) technologies aimed at automating different areas of HR for better productivity, redefining how HR processes are delivered, and improving work-life balance focusing on real-time access, decision-making and results (Mazurchenko & Maršíková, 2019).

The main idea behind this concept is to modernize employee training and skill development, searching for talents, and to streamline overall human resources management solutions and functions by utilizing real-time interactive platforms, mobile-first apps (Dolan et al., 2022). Identify digital HR as a flexible approach to staff development with an active role of digital space in

stimulating changes and an effective use of employees' talents and experience. Contrary to traditional personnel management, digital HR are focused on the implementation of innovative solutions, personnel productivity improvement and it perceives employees as investments that should be supported (Khan et al., 2021).

Expert System of employee management is about planning and implementing digital technologies to support and network the HR profession (Mitrofanova et al., 2019). Operational functions of HR such as pay roll processing, but also managerial functions such as compensation, performance management or development are "digitally" supported. The positive operational effects of this digital employee management such as less cost, higher speed and quality of HR processes, increased corporation and trust among HR stakeholders, more strategic orientation, etc. are obvious (Chytiri, 2019). Some negative issues such as lack of user acceptance, threats to privacy, loss of personal contacts, downsizing the HR - department or burdening HR professionals with technical implementation, administration and application tasks, should not be out of consideration. Expert System ethics is another one very important issue that must be addressed by HR managers, regarding growing unemployment (downsizing), hiring bias, inappropriate employee data usage, transparency (Chytiri, 2019).

Adoption of new technologies enables HRM function in the organization to develop sound succession planning strategies by identifying and rethinking critical roles and establishing contingency plans using scenario-based planning instead of traditional HR planning. The key success element of this process is effective communication to ensure employee readiness (Barišić et al., 2021). Human resource strategic planning is the starting point of HRM. Managers use artificial intelligence technology as an auxiliary decision-making system, which can carry out strategic planning more comprehensively. Technologies such as data mining and knowledge discovery are needed to collect global information and combine with existing internal and external information (Jia et al., 2018; Khan & Shaheen, 2023).

After summarizing the information, we can understand the current rationality of the human resources situation and forecast, evaluate and adjust the company's future management. Relying on the statistical and modification functions of the intelligent decision support system, the report is finally provided with various required information (Zhai et al., 2020). As an important part of the system, the recruitment process includes review, screening resumes, interviewing candidates, matching suitable positions, etc. Ideal Corp,

a software company that uses artificial intelligence to automate recruitment tasks, its CEO Somen Mondal says that the biggest impact of artificial intelligence is to automatically screen candidates and reduce bias. Artificial intelligence can learn the qualifications for successful employees in a particular position and apply this knowledge to select qualified candidates and score and rate candidates. According to Mondal, the company used artificial intelligence software to recruit, with a 71% reduction in recruitment costs and a threefold increase in recruitment efficiency.

An expert system by Digital Employee Management: DEM refers to the planning and network, the HR functions such as pay roll processing, attendance management or record keeping, compensation, performance management or development are digitally supported and enabled and thereby often deeply changed. This ongoing digitalization of HRM practice is basically assumed to offer large opportunities for the discipline. It is present throughout any business and in the everyday lives and interactions of employees (Bhanu Prakash et al., 2019).

Expert System which depicts the simulation world, has undergone numerous technological evolutions in the past decade (Sirait et al., 2023; Tehseen et al., 2020), as a result of technological advancements including telepresence. Studies have demonstrated that ES features such as quality of content, system, and vividness can directly impact user's attitudinal and behavioural responses. ultimately, underlying e-HRM adoption motives (Najam et al., 2022).

## Conclusion

The expert system obviously affect HR activities and change the role of HR managers from static to dynamic and strategic. The challenges and opportunities for HR managers are many to increase employee productivity and eventually profitability, by linking effectively digital employees to automated jobs and the new digital forms and organization structure. New HR strategies are needed to fill the digital skills gap to build loyalty and engagement, managing diversity, enabling work-life integration and retaining the talent pool of digital employees.

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## Author Contributions

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## Conflicts of Interest

In this research, there is no tug of interest and or hidden interests among the researchers. In addition, this research is also not an order from any funder because it is an independent research, or in other words, the research team itself plays a role in preparing proposals, selecting topics, conceptualizing problems, collecting data, analyzing problems, drawing conclusions until the publication stage in this journal.

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