

## Designing a Sustainable Human Resource Development Model Based on In-Service Training of Education Staff

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### ABSTRACT

**Purpose:** The present study aimed to design and validate a sustainable human resource development model based on in-service training of education staff.

**Methods and Materials:** This study employed a mixed-methods approach with an exploratory–descriptive design. In the qualitative phase, a systematic literature review and grounded theory methodology were used to identify the dimensions, components, and indicators of sustainable human resource development with an emphasis on in-service training. Data were collected through semi-structured interviews with 15 experts in educational human resource management, selected through purposive sampling until theoretical saturation was achieved. The qualitative data were analyzed using open, axial, and selective coding procedures in MAXQDA software. In the quantitative phase, a descriptive–survey method was applied to validate the proposed model. A researcher-developed questionnaire, designed based on qualitative findings and refined using the Delphi technique, was distributed among a randomly selected sample of 384 education staff. Data analysis was conducted using structural equation modeling in SmartPLS, and the reliability and validity of constructs were assessed using Cronbach’s alpha, composite reliability, average variance extracted, and goodness-of-fit indices.

**Findings:** The results of structural equation modeling confirmed the adequacy and strong fit of the proposed model, indicating significant relationships among the key constructs. In-service training was found to have a positive and significant effect on professional competency development, which in turn significantly influenced employee motivation, job satisfaction, and organizational commitment. Organizational culture and transparency demonstrated a significant positive relationship with both employee-related outcomes and employer branding. Human resource marketing and employer branding were also found to significantly enhance employee retention, satisfaction, and organizational performance. The overall model exhibited acceptable reliability and convergent validity, with all path coefficients being statistically significant, confirming the robustness of the conceptual framework.

**Conclusion:** The findings suggest that sustainable human resource development in educational organizations can be effectively achieved through the integration of in-service training, competency development, supportive organizational culture, and strategic employer branding. The validated model provides a comprehensive framework for enhancing employee performance, motivation, and organizational sustainability. By adopting a holistic and forward-looking approach to human resource management, educational institutions can improve their adaptability, strengthen their human capital, and achieve long-term organizational success.

**Keywords:** *sustainable human resource development, in-service training, employer branding, human resource marketing, organizational culture, structural equation modeling*

## 1. Introduction

Sustainable human resource development has emerged as a critical paradigm in contemporary management literature, reflecting a shift from traditional, efficiency-oriented human resource practices toward a more holistic and long-term perspective that integrates economic, social, and environmental considerations. In today's dynamic and knowledge-based economy, organizations increasingly recognize that human capital is not merely a resource to be utilized, but a strategic asset that must be developed, maintained, and sustained over time. This perspective aligns with the broader concept of sustainability, which emphasizes intergenerational equity, organizational resilience, and continuous capability enhancement. Accordingly, sustainable human resource management (SHRM) has been conceptualized as an approach that seeks to balance organizational performance with employee well-being, environmental responsibility, and social legitimacy (Kramar, 2014; Papademetriou, 2025).

The evolution of SHRM is rooted in earlier frameworks of strategic human resource management but extends beyond them by incorporating sustainability principles into HR policies and practices. While traditional HRM focuses primarily on aligning human resources with organizational goals, sustainable HRM emphasizes long-term workforce viability, ethical practices, and the development of competencies that enable organizations to adapt to complex and uncertain environments (López-Cabrales & Valle-Cabrera, 2020; Renwick et al., 2013). This paradigm shift reflects the growing recognition that organizations must not only achieve short-term performance outcomes but also ensure the sustainability of their human capital systems in the face of rapid technological, economic, and social changes.

One of the key mechanisms for achieving sustainable human resource development is in-service training, which plays a pivotal role in enhancing employees' knowledge, skills, and attitudes. Continuous learning and professional

development are essential for maintaining workforce competitiveness and adaptability, particularly in sectors characterized by rapid change, such as education. In-service training enables employees to update their competencies, align with organizational goals, and respond effectively to emerging challenges. Moreover, it fosters a culture of learning and innovation, which is a fundamental component of sustainable organizations (Rajabi Farjad & Touranian, 2022; Zare et al., 2020).

In the context of educational organizations, the importance of sustainable human resource development is even more pronounced, as the quality of human capital directly influences educational outcomes and societal development. Teachers and educational staff are key agents in shaping future generations, and their continuous professional development is essential for ensuring the effectiveness and sustainability of educational systems. Therefore, designing models that integrate in-service training with sustainable HR development is crucial for enhancing the performance and resilience of educational institutions (Ebrahimpour et al., 2025; Rounaghi et al., 2024).

Another critical dimension of sustainable human resource development is employer branding, which refers to the process of creating and promoting a distinctive organizational identity as an employer. The concept of employer branding, initially introduced by Ambler and Barrow, highlights the importance of aligning HR practices with brand management strategies to attract, retain, and motivate employees (Ambler & Barrow, 1996). In sustainable organizations, employer branding extends beyond traditional recruitment and retention strategies to encompass values such as social responsibility, employee well-being, and environmental sustainability (Aggerholm et al., 2011).

The integration of employer branding with sustainable HRM practices has significant implications for organizational performance. A strong employer brand enhances employee engagement, commitment, and loyalty,

thereby contributing to improved productivity and reduced turnover. Furthermore, it strengthens the organization's reputation in the labor market, enabling it to attract high-quality talent and maintain a competitive advantage. In this regard, emotional branding and customer experience have also been identified as influential factors in shaping brand equity, indicating the interconnectedness of internal and external branding processes (Behjat et al., 2016; Taghipourian, 2026).

Human resource marketing is another concept that complements employer branding and sustainable HRM. It involves applying marketing principles to human resource management in order to better understand and meet the needs of employees as internal customers. This approach emphasizes the importance of creating value propositions for employees, enhancing their experience, and fostering a positive organizational culture. By integrating human resource marketing with sustainable practices, organizations can create a supportive and engaging work environment that promotes long-term employee satisfaction and performance (Esgandari et al., 2019; Khosravi et al., 2021).

In addition to these strategic dimensions, organizational culture plays a fundamental role in facilitating sustainable human resource development. A culture that promotes transparency, collaboration, innovation, and continuous learning is essential for fostering employee engagement and adaptability. Such a culture not only enhances individual performance but also contributes to organizational resilience and sustainability. Studies have shown that organizations with strong and positive cultures are better equipped to implement sustainable HR practices and achieve long-term success (Asali et al., 2024; Ghezelsoflou et al., 2024).

The role of foresight and future-oriented approaches in sustainable HR development has also gained increasing attention in recent years. Strategic foresight enables organizations to anticipate future trends, identify potential opportunities and threats, and develop proactive strategies for managing human resources. Scenario planning, as a key foresight tool, allows organizations to explore alternative futures and assess the implications of different scenarios for HR development and employer branding. This approach enhances organizational agility and preparedness, enabling decision-makers to respond effectively to uncertainty and change (Chermack, 2004; Chermack & Swanson, 2008).

Recent studies have emphasized the importance of integrating foresight capabilities into HRM to enhance sustainability and resilience. By adopting a forward-looking perspective, organizations can better align their HR

strategies with emerging trends and ensure the long-term viability of their human capital systems. This is particularly relevant in the context of rapid technological advancements, globalization, and evolving workforce expectations, which require organizations to continuously adapt and innovate (Asali et al., 2024; Sparks & McCann, 2021).

Moreover, sustainable human resource development is closely linked to organizational innovation and knowledge management. Continuous learning, skill development, and knowledge sharing are essential for fostering innovation and maintaining competitiveness. Organizations that invest in the development of their human capital are more likely to generate innovative ideas, improve processes, and achieve sustainable growth. In this regard, the integration of training, development, and innovation strategies is critical for enhancing organizational performance and sustainability (Faeghi et al., 2024; Momenirad et al., 2024).

Despite the growing body of literature on sustainable HRM, there remains a need for comprehensive models that integrate various dimensions of sustainability, including training, employer branding, organizational culture, and foresight. Many existing studies have focused on specific aspects of sustainable HRM, such as green HR practices or employee well-being, without providing a holistic framework that captures the complex interactions among these factors. Therefore, developing integrated models that address these gaps is essential for advancing both theory and practice in this field (Jabbour & Santos, 2008; Rezaei Sadrabadi et al., 2023).

In addition, empirical studies have highlighted the importance of context-specific models that consider the unique characteristics of different sectors and regions. For example, the challenges and opportunities associated with sustainable HR development in educational organizations may differ significantly from those in other sectors. Therefore, there is a need for research that focuses on specific contexts, such as education, to develop tailored models that address the unique needs and challenges of these organizations (Alipour et al., 2025; Ebrahimpour et al., 2025).

Furthermore, the increasing complexity and uncertainty of the organizational environment underscore the importance of adopting integrative and adaptive approaches to HR development. Organizations must be able to respond to changing conditions while maintaining stability and continuity in their human resource systems. This requires a balanced approach that combines strategic planning, continuous learning, and innovation, supported by robust

analytical tools such as structural equation modeling and foresight techniques (Papademetriou, 2025; Rounaghi et al., 2024).

In conclusion, sustainable human resource development represents a multifaceted and dynamic field that requires the integration of various theoretical and practical perspectives. By combining in-service training, employer branding, human resource marketing, organizational culture, and foresight approaches, organizations can develop comprehensive strategies for achieving sustainability and long-term success. Therefore, the aim of this study is to design a sustainable human resource development model based on in-service training of education staff in District 12 of Mashhad.

## 2. Methods and Materials

The present study was conducted with the aim of designing a sustainable human resource development model based on in-service training of education staff, and in terms of approach, it is categorized as a mixed-methods (qualitative–quantitative) study with an exploratory–descriptive nature. This research is grounded in the principles of empirical sciences and adopts an objectivist approach; therefore, the research philosophy is positivism in the quantitative section and controlled interpretivism in the qualitative section. The overall logic of the study follows an inductive reasoning process, moving from specific observations to general conclusions, and in terms of purpose, it is considered applied, as its results can be directly utilized to improve policies and programs related to in-service training of education staff. Regarding data collection methods, the study falls within descriptive research of an exploratory type, and the research onion model was employed to explain the methodological layers.

In the qualitative section of the study, a two-phase approach was adopted. In the first phase, a systematic literature review was conducted to develop the theoretical framework and to identify the dimensions, components, and indicators of sustainable human resource development with an emphasis on in-service training of education staff. In this stage, domestic and international scientific sources, including journal articles, books, and relevant theses published between 2000 and 2025, were identified and reviewed using relevant keywords. Ultimately, based on judgmental sampling, 50 valid scientific sources were selected and analyzed to extract the initial components of the study. In the second phase, to deepen the findings, validate

the extracted components, and design the initial conceptual model, the grounded theory method was employed. Qualitative data were collected through semi-structured interviews with experts in educational human resource management, educational planning, and in-service training. These interviews were conducted with a flexible structure to allow the emergence of new concepts. The data obtained from the interviews were analyzed through open, axial, and selective coding processes, and ultimately, the main concepts and categories were extracted to develop the conceptual model of sustainable human resource development based on in-service training.

In the quantitative section, a descriptive–survey approach was used to validate the model derived from the qualitative phase and to examine the relationships among constructs. The data collection instrument was a researcher-developed questionnaire designed based on the qualitative findings and expert opinions obtained through the Delphi technique. The content validity of the questionnaire was assessed by specialists, and construct validity was examined using confirmatory factor analysis, while reliability was evaluated using indices such as Cronbach's alpha and composite reliability.

Quantitative data analysis was conducted using SmartPLS software and structural equation modeling to evaluate the validity, reliability, and goodness of fit of the proposed model, ultimately leading to the presentation of the final model of sustainable human resource development based on in-service training of education staff.

The statistical population in the qualitative section consisted of academic experts, educational managers, and specialists in human resource management and in-service training who had relevant academic or professional experience related to the research topic. Given the limited population and the exploratory nature of the study, a census method was employed, and 15 participants were selected for qualitative interviews. This number was sufficient to achieve theoretical saturation. In the quantitative section, the statistical population included education staff (administrative and instructional personnel). Sampling was conducted using a random method, and the sample size was determined using Cochran's formula, with a confidence level of 95 percent, a margin of error of 5 percent, and assuming  $p = q = 0.5$ . Considering the assumption of an infinite population, the sample size was calculated to be 384 participants. The collected data were used for statistical analyses, including factor analysis and structural equation modeling.

Overall, the data collection tools in this study included document analysis, interviews, and questionnaires. However, the primary instruments used were semi-structured interviews in the qualitative section and questionnaires in the quantitative section, both of which were employed to achieve the research objectives and to design the sustainable human resource development model based on in-service training.

### 3. Findings and Results

Given that the objective of this study is to develop a sustainable human resource development model based on in-service training of education staff in District 12 of Mashhad, the analysis of the findings in this section is conducted

through qualitative data analysis. In fact, the variables required for the research model are extracted from the interviews, and the relationships among them are identified. In line with data analysis, first, the validity of the research was examined according to the method of Lincoln and Guba (1980), and the reliability of the study was assessed based on the internal agreement method. Subsequently, descriptive statistics of the interview participants were presented, followed by data analysis aimed at extracting codes, categories, and relationships among them using MAXQDA software. In the present study, to assess research validity, the Lincoln and Guba (1980) method was employed, which is based on four criteria: transferability, credibility, dependability, and confirmability, and this approach confirmed the validity of the research instrument.

**Table 1**

*Research Validity Based on Lincoln and Guba (1980)*

Criterion	Process
Transferability	Surveying experts who did not participate in the present study
Credibility	Allocating sufficient time for the research and validating interview data by participants
Confirmability	Documentation and adherence to all research steps and processes
Dependability	Recording all details and documenting all aspects during the interview stage

To evaluate the reliability of the research, two individuals external to the research topic were asked, after receiving

necessary explanations and training, to code five interviews in order to measure and compare the level of reliability.

**Table 2**

*Research Reliability Using the Internal Agreement Method*

Interview	Number of Extracted Codes	Number of Agreements	Percentage Agreement (Reliability)
Interview 1	43	37	86.05%
Interview 4	51	42	82.40%
Interview 5	37	30	81.10%
Interview 9	34	25	73.53%
Interview 11	28	23	82.10%

As shown in the table above, the level of internal agreement for the five interviews is above 70 percent, indicating acceptable reliability for the conducted interviews and the codes extracted by the researcher.

To extract the variables required for the research model in addressing experts' professional domain issues, various methods are employed. These methods can be categorized in different ways. A common classification is based on how knowledge is elicited from experts. Accordingly, two

categories of direct and indirect knowledge elicitation are presented. Direct methods involve explicitly requesting explanations from experts regarding how tasks are performed. A necessary condition for the success of these methods is that the expert has sufficient ability and willingness to share their knowledge. By analyzing the interview data, additional concepts were extracted in a similar manner. This process is fully illustrated in the following table.

**Table 3**

*Open Coding Process of Expert Interviews*

Selective Coding / Indicators	Open Coding	Axial Coding	Interview Text
Employee skill and motivation development indicator	Career growth opportunities, employee motivation, commitment	Human resource development	“The organization should create career growth opportunities for employees to enhance their motivation and commitment.”
Cultural transparency and cohesion indicator	Internal communication, goal communication, value awareness	Organizational culture and transparency	“Internal communication should ensure that employees are aware of organizational goals and values.”
Employer brand attractiveness and credibility indicator	Employer branding, talent attraction, employee retention	Human resource marketing	“Employer brand experience significantly affects talent attraction and retention.”
Employee satisfaction and loyalty indicator	Flexibility, work–life balance, employee satisfaction	Employee welfare and motivation	“Workplace flexibility and facilitating work–life balance increase employee satisfaction and loyalty.”
Professional learning and development indicator	Continuous training, professional learning, productivity	Human resource development and skill enhancement	“Providing continuous learning opportunities and professional training increases efficiency and productivity.”
Job motivation and satisfaction indicator	Recognition, rewards, motivation	Employee motivation and satisfaction	“Regular recognition and rewards for good performance strengthen employee motivation.”

After identifying and extracting codes from the interviews, the next step involves determining categories and synthesizing concepts. In this section, based on the

conceptual meanings of the codes, the main categories or dimensions of the model were identified.

**Table 4**

*Concepts and Themes Derived from Qualitative Data*

Extracted Indicators	Components / Key Concepts	Main Theme
Professional learning and skill development indicator	Career growth opportunities, continuous training, skill enhancement	Human resource development
Cultural cohesion and transparency indicator	Internal communication, communication of goals and values, decision-making transparency	Organizational culture and transparency
Employer brand attractiveness and credibility indicator	Employer brand credibility, attractiveness for talent attraction, employee retention	Human resource marketing and employer branding
Employee satisfaction and loyalty indicator	Workplace flexibility, work–life balance, employee satisfaction and loyalty	Employee welfare and motivation
Job motivation and satisfaction indicator	Recognition and rewards, intrinsic motivation, performance acknowledgment	Job motivation and satisfaction

Achievement of Theoretical Saturation  
The data collection process continues until the researcher reaches the point of saturation, where the concepts related to the phenomenon under study, as expressed by different

interviewees, become repetitive and no new information is added to the model. The following table illustrates how this criterion was achieved in the present study.

**Table 5**

*Achievement of Theoretical Saturation*

Dimension	Frequency of Open Codes	Number of Concepts	Completion of Previous Concepts	Emergence of New Categories	Completion of Previous Categories
Human resource development	83	45	—	11	—
Organizational culture and transparency	62	61	16	3	2
Human resource marketing and employer branding	69	67	6	—	1
Employee welfare and motivation	48	69	2	—	—
Job motivation and satisfaction	43	62	1	—	—

Scenario planning is a foresight method used to analyze and predict various environmental and organizational possibilities. In this approach, key internal and external factors affecting human resource performance and employer branding are first identified, and then, considering existing uncertainties, several plausible scenarios are developed. Each scenario comprises a combination of economic,

technological, social, and cultural trends, and their implications for sustainable human resource development and branding strategies are examined. This method enables organizations to anticipate environmental changes, adopt flexible planning, and adjust their strategies according to each scenario.

**Table 6**

*Scenario Analysis*

Factor Conditions	Key Factors	Implications for Employer Brand	Implications for Human Resources	Scenario
All factors at a high level	Employee skill development, organizational culture, employee welfare	Enhancement of employer brand attractiveness and talent acquisition	Increased motivation and productivity, employee loyalty	Scenario 1: Sustainable Growth
Factors at moderate to low levels	Skill shortages, rapid organizational changes	Decline in brand credibility and difficulty in recruitment	Reduced motivation, increased turnover, decreased efficiency	Scenario 2: Human Resource Challenges
Factors at variable and uncertain levels	Emerging technologies, intense competition, economic policies	Necessity to redefine brand messaging and recruitment strategies	Need for rapid training and flexibility in HR programs	Scenario 3: Unexpected Environmental Changes
Factors at a high level	Innovation culture, creative human capital	Strengthening employer brand as an attractive environment for talent	Utilization of innovative ideas, rapid career growth	Scenario 4: Innovative Opportunities

Using scenario planning, organizations can identify and analyze key factors affecting human resources and employer branding, anticipate the potential consequences of environmental changes, and engage in flexible strategic planning. The results of the scenarios indicate that strengthening skill development, enhancing organizational culture, focusing on employee welfare and motivation, and leveraging organizational innovation can, across all scenarios, lead to the retention of employee loyalty and improved organizational performance. Conversely, neglecting environmental changes and lacking human capital with the necessary competencies can negatively affect efficiency, employee motivation, and employer brand credibility. This analysis assists human resource managers

in making strategic decisions based on plausible realities and preparing for various scenarios. Moreover, scenario planning provides an effective tool for outlining alternative pathways and designing long-term policies aimed at sustainable human resource development and employer branding.

In the subsequent stage, to evaluate the conceptual model of the research and to ensure the presence or absence of causal relationships among the research variables, as well as to assess the fit of the observed data with the conceptual model, the research model was tested using structural equation modeling. The results of the model testing are reflected in the diagrams.

Figure 1

Measurement of the Overall Model in the Standardized State

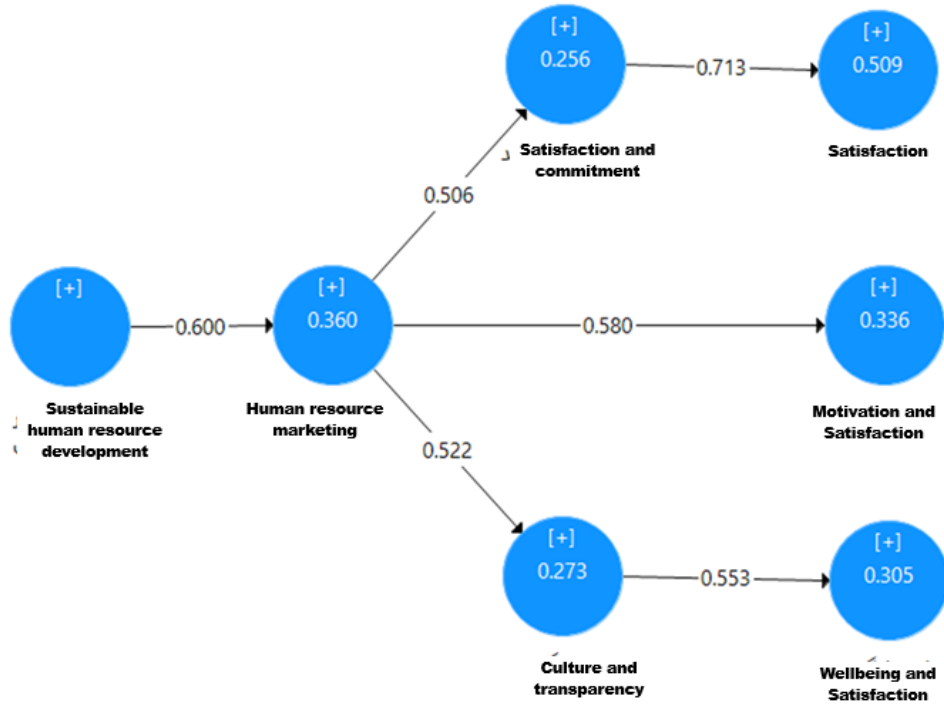
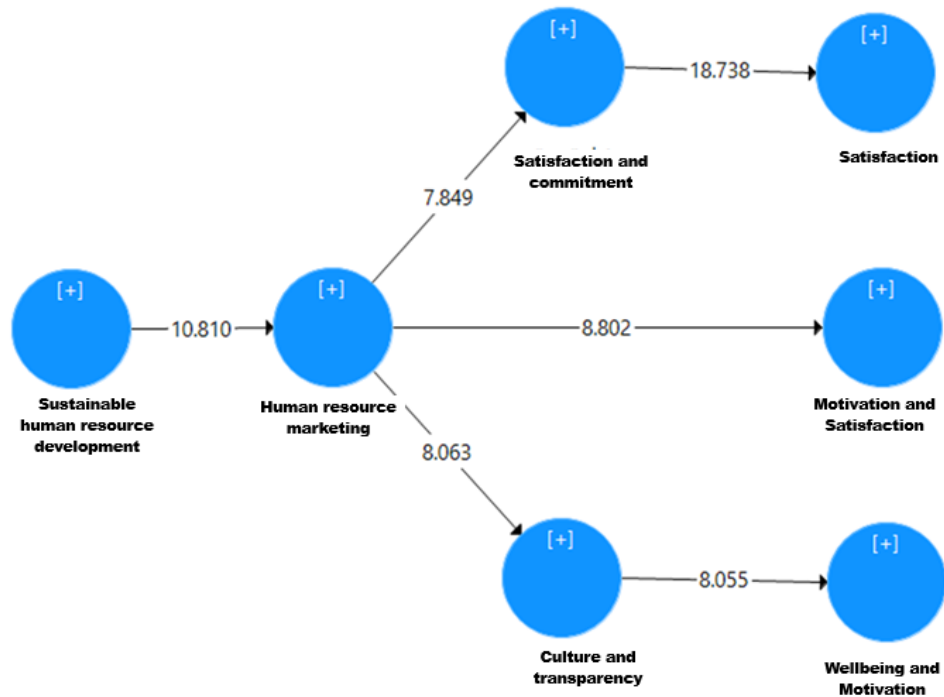


Figure 2

Measurement of the Overall Model in the Significant State



To assess reliability, Cronbach’s alpha and composite reliability were used; to assess validity, convergent validity

was employed; and to evaluate model fit, the goodness-of-fit (GOF) index was utilized.

**Table 7**

*Reliability and Validity of Outer Models*

Variable	CR	AVE	MSV	Fornell–Larcker Matrix (1)	(2)	(3)	(4)	(5)
Sustainable human resource development	0.787	0.552	0.193	0.743				
Human resource marketing	0.844	0.644	0.478	0.342	0.803			
Satisfaction and commitment	0.918	0.651	0.423	0.331	0.470	0.807		
Culture and transparency	0.885	0.720	0.478	0.440	0.692	0.650	0.849	
Outcomes	0.960	0.649	0.149	0.066	0.259	0.213	0.386	0.806

A Cronbach’s alpha value above 0.70 indicates acceptable reliability. A composite reliability (CR) value above 0.70 for each construct indicates adequate internal consistency of the measurement model. An average variance extracted (AVE) value above 0.50 indicates acceptable convergent validity. Considering the threshold values of 0.01, 0.25, and 0.36 as weak, moderate, and strong levels for the GOF index, respectively, the obtained value of 0.62 indicates a strong model fit.

**4. Discussion and Conclusion**

The findings of the present study demonstrated that sustainable human resource development in the education system is a multidimensional construct influenced by a set of interrelated components, including professional competency development, quality of in-service training, employee motivation and job satisfaction, organizational culture and transparency, human resource marketing, and employer branding. The structural equation modeling results confirmed the existence of significant relationships among these constructs, indicating that the proposed model provides a robust and empirically supported framework for understanding how in-service training can serve as a foundational mechanism for achieving sustainability in human resource systems. In particular, the results revealed that enhancing the quality and continuity of in-service training programs leads to improved professional competencies, which in turn positively affect employee motivation, organizational commitment, and overall performance. These findings are consistent with the conceptualization of sustainable HRM as an integrative approach that aligns human capital development with long-term organizational goals and employee well-being (Kramar, 2014; Papademetriou, 2025).

The significant impact of professional competency development on sustainable human resource outcomes highlights the central role of continuous learning and skill enhancement in modern organizations. The results indicated

that employees who have access to structured and high-quality training opportunities demonstrate higher levels of engagement, adaptability, and productivity. This finding aligns with prior research emphasizing that sustainable HR development requires continuous investment in employee capabilities to ensure long-term organizational resilience and competitiveness (Rajabi Farjad & Touranian, 2022; Zare et al., 2020). Moreover, the findings support the argument that human capital development is a key driver of organizational sustainability, as it enables organizations to respond effectively to environmental changes and technological advancements (López-Cabrales & Valle-Cabrera, 2020).

Another important finding of the study was the significant role of organizational culture and transparency in facilitating sustainable human resource development. The results showed that a culture characterized by open communication, shared values, and transparency in decision-making enhances employee trust, satisfaction, and commitment. This finding is consistent with previous studies that highlight the importance of organizational culture as a critical enabler of sustainable HR practices and employee engagement (Asali et al., 2024; Ghezelsoufrou et al., 2024). A transparent and cohesive organizational culture not only supports the effective implementation of training programs but also reinforces positive work attitudes and behaviors, thereby contributing to long-term sustainability.

The study also revealed that employee motivation and job satisfaction are key mediating variables in the relationship between in-service training and sustainable HR outcomes. Employees who perceive training programs as relevant, fair, and beneficial are more likely to exhibit higher levels of intrinsic motivation, job satisfaction, and organizational commitment. This finding is in line with earlier research suggesting that employee-centered HR practices enhance psychological well-being and foster a sense of belonging, which are essential for sustainable performance (Khosravi et al., 2021; Renwick et al., 2013). Furthermore, the results

support the notion that motivation and satisfaction are not merely outcomes but also drivers of sustainable HR development, as they influence employees' willingness to engage in continuous learning and organizational initiatives.

The integration of human resource marketing and employer branding within the proposed model represents another significant contribution of the study. The findings indicated that organizations that actively manage their employer brand and adopt a marketing-oriented approach to HR are more successful in attracting, retaining, and engaging talented employees. This result is consistent with the foundational work of Ambler and Barrow, who conceptualized employer branding as a strategic tool for enhancing organizational attractiveness (Ambler & Barrow, 1996). Moreover, recent studies have emphasized that sustainable employer branding involves aligning organizational values with employee expectations and societal norms, thereby enhancing both internal and external stakeholder perceptions (Aggerholm et al., 2011; Esgandari et al., 2019).

The positive relationship between employer branding and sustainable HR outcomes observed in this study also reflects the growing importance of emotional and experiential dimensions in organizational branding. Employees are increasingly seeking meaningful and value-driven work experiences, and organizations that can effectively communicate their commitment to sustainability and employee well-being are more likely to build strong and enduring relationships with their workforce. This finding is supported by research highlighting the role of emotional branding and customer experience in shaping brand equity and organizational reputation (Behjat et al., 2016; Taghipourian, 2026).

Furthermore, the findings underscore the importance of integrating foresight and scenario planning approaches into human resource management. The scenario analysis conducted in this study demonstrated that different environmental conditions can significantly influence HR strategies and outcomes, highlighting the need for flexible and adaptive planning. This result is consistent with the literature on strategic foresight, which emphasizes the value of scenario planning as a tool for enhancing organizational preparedness and resilience (Chermack, 2004; Chermack & Swanson, 2008). By anticipating potential future developments, organizations can design proactive HR strategies that mitigate risks and capitalize on emerging opportunities.

The role of foresight in sustainable HR development is further supported by studies that highlight the importance of future-oriented capabilities in managing uncertainty and complexity. The findings of this study suggest that organizations that incorporate foresight into their HR practices are better positioned to align their strategies with long-term sustainability goals and respond effectively to changing environmental conditions (Rounaghi et al., 2024; Sparks & McCann, 2021). This aligns with the broader trend toward integrating strategic foresight with HRM to enhance organizational agility and innovation (Ebrahimpour et al., 2025).

In addition, the study contributes to the literature by providing empirical evidence on the interrelationships among key components of sustainable HR development within the specific context of the education sector. While previous studies have examined individual aspects of sustainable HRM, such as green practices or employee well-being, this study offers a comprehensive model that integrates multiple dimensions, including training, culture, branding, and foresight. This holistic perspective is consistent with the view that sustainable HRM requires a systemic approach that considers the complex interactions among various organizational factors (Jabbour & Santos, 2008; Rezaei Sadrabadi et al., 2023).

The findings also highlight the importance of contextual factors in shaping sustainable HR practices. The education sector presents unique challenges and opportunities, including the need for continuous professional development, the importance of knowledge transfer, and the role of human capital in societal development. The results of this study suggest that tailored models that account for these contextual characteristics are essential for achieving effective and sustainable HR outcomes (Alipour et al., 2025; Momenirad et al., 2024).

Overall, the discussion of the findings indicates that sustainable human resource development is a multifaceted process that requires the integration of various strategic, cultural, and operational elements. By leveraging in-service training as a central mechanism, organizations can enhance employee competencies, foster motivation and commitment, strengthen their employer brand, and ultimately achieve long-term sustainability. The alignment of these findings with existing literature reinforces the validity and relevance of the proposed model and highlights its potential contribution to both theory and practice in the field of human resource management.

One of the main limitations of the present study is its focus on a specific geographical and organizational context, namely the education system of District 12 of Mashhad, which may limit the generalizability of the findings to other regions or sectors. Additionally, the use of self-reported data in the quantitative phase may introduce potential biases, such as social desirability or response bias. Another limitation relates to the cross-sectional nature of the study, which restricts the ability to draw causal inferences over time. Furthermore, while the mixed-methods approach provided a comprehensive understanding of the research problem, the integration of qualitative and quantitative findings could be further strengthened through longitudinal or experimental designs.

Future research should aim to replicate and extend the proposed model in different organizational and cultural contexts to enhance its generalizability and applicability. Longitudinal studies could provide deeper insights into the dynamic relationships among the components of sustainable HR development and their impact over time. Additionally, future studies may explore the role of emerging technologies, such as artificial intelligence and digital learning platforms, in enhancing in-service training and HR sustainability. Further research could also investigate the moderating effects of organizational size, leadership style, and external environmental factors on the relationships identified in this study.

From a practical perspective, the findings of this study offer valuable insights for managers and policymakers in the education sector and beyond. Organizations should prioritize the design and implementation of high-quality in-service training programs that are aligned with both organizational goals and employee needs. Emphasizing the development of a supportive organizational culture, fostering transparency, and enhancing employee motivation can significantly contribute to sustainable HR outcomes. Additionally, organizations should invest in employer branding and adopt a marketing-oriented approach to HR to attract and retain talented employees. Integrating foresight and scenario planning into HR strategies can further enhance organizational resilience and adaptability, enabling organizations to navigate uncertainty and achieve long-term success.

### Authors' Contributions

Authors equally contributed to this article.

### Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

### Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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### Declaration of Interest

The authors report no conflict of interest.

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### Ethical Considerations

All procedures performed in studies involving human participants were under the ethical standards of the institutional and, or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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