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Investigating the Impact of Organizational Learning and Innovation on Sustainable Human Resource Development in Hospitals of Kermanshah

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A B S T R A C T

Objective: The objective of this study was to examine the impact of organizational learning and organizational innovation on sustainable human resource development in hospitals of Kermanshah using a structural equation modeling approach.

Methods and Materials: This applied study employed a descriptive–correlational design using structural equation modeling to investigate the relationships among organizational learning, innovation, and sustainable human resource development. The statistical population consisted of all employees working in hospitals affiliated with Kermanshah University of Medical Sciences and the Social Security Organization in 2023 (N = 2,560). Using Cochran's formula and stratified random sampling with proportional allocation, 328 valid questionnaires were collected and analyzed. Data were gathered using a researcher-developed questionnaire consisting of measures for empowerment and skill development, workforce diversity and equity, social development participation, sustainable quality of work life improvement, sustainable human resource development, environmental commitment and training, sustainable learning and innovation, and green human resource governance and leadership. The questionnaire used a five-point Likert scale and demonstrated acceptable validity and reliability. Data were analyzed using SPSS version 26 and SmartPLS version 4, including confirmatory factor analysis and structural equation modeling to evaluate the measurement and structural models.

Findings: The results of structural equation modeling indicated that all components of organizational learning and innovation had significant positive effects on sustainable human resource development ($p = 0.001$). Sustainable human resource development showed the strongest effect ($\beta = 0.888$, $t = 8.490$), followed by sustainable learning and innovation ($\beta = 0.685$, $t = 6.854$), green human resource governance and leadership ($\beta = 0.655$, $t = 7.403$), and sustainable quality of work life improvement ($\beta = 0.638$, $t = 6.497$). Social development

participation (β = 0.597, t = 7.008), environmental commitment and training (β = 0.467, t = 5.801), workforce diversity and equity (β = 0.444, t = 5.684), and empowerment and skill development (β = 0.421, t = 5.647) also demonstrated significant positive effects. The model explained meaningful variance in sustainable human resource development, confirming the validity of the proposed structural model.

Conclusion: The findings demonstrate that organizational learning and innovation play critical roles in enhancing sustainable human resource development in hospital settings. Learning-oriented practices, innovation-driven initiatives, sustainability-focused leadership, and workforce empowerment contribute significantly to the development of sustainable human resource systems. Hospitals that invest in organizational learning, promote innovation, and implement sustainability-oriented human resource strategies are better positioned to enhance workforce capabilities, improve organizational performance, and ensure long-term sustainability.

Keywords: *Organizational Learning, Organizational Innovation, Sustainable Human Resource Development, Healthcare Organizations, Structural Equation Modeling, Sustainability-Oriented Leadership*

1 Introduction

Healthcare organizations operate in increasingly complex, dynamic, and sustainability-driven environments where the effective development and management of human resources play a critical role in ensuring long-term organizational performance and societal well-being. Hospitals, in particular, represent knowledge-intensive institutions where the quality of healthcare delivery is directly dependent on the competencies, adaptability, and sustainability-oriented development of human resources. Sustainable human resource development has emerged as a strategic priority for healthcare institutions seeking to enhance organizational resilience, workforce effectiveness, and environmental and social responsibility. Contemporary organizational paradigms emphasize that sustainable human resource development involves not only enhancing employee skills and competencies but also aligning workforce development with broader economic, social, and environmental sustainability objectives (Schneider, 2024; Sun, 2025). This multidimensional perspective reflects the shift from traditional human resource management approaches toward sustainability-driven models that prioritize long-term organizational viability, workforce well-being, and continuous organizational adaptation.

Organizational learning has been widely recognized as a foundational mechanism for achieving sustainable human resource development. Organizational learning refers to the processes through which organizations acquire, create, share, and apply knowledge to improve performance and adapt to changing environmental conditions. Through organizational learning, employees develop new competencies, refine existing skills, and enhance their capacity to respond effectively to emerging organizational challenges (Järvenpää et al., 2025; Witt et al., 2024). Organizational learning contributes significantly to employee development by fostering continuous knowledge acquisition, promoting knowledge sharing, and enhancing cognitive and behavioral adaptability. Learning-oriented organizations demonstrate superior capacity for innovation, problem-solving, and organizational effectiveness compared to organizations lacking structured learning systems (Chinchilla & Grau, 2025; Meher et al., 2024). In healthcare environments characterized by rapid technological change and evolving clinical practices, organizational learning becomes essential for maintaining workforce competence and ensuring sustainable human resource development.

The increasing integration of digital technologies and artificial intelligence in organizational systems has further amplified the importance of organizational learning as a strategic capability. Digital transformation requires employees to continuously update their skills and adapt to new technological environments, making learning a continuous and essential organizational process. Artificial intelligence and digital learning platforms provide new opportunities for enhancing organizational learning by facilitating knowledge dissemination, personalized training, and competency development (Olusegun et al., 2024; Slatvinskyi, 2025). Moreover, artificial intelligence-driven organizational systems can enhance workforce performance by supporting decision-making, improving skill development, and enabling adaptive learning environments (Asiabar et al., 2025; Qaiser et al., 2025). These

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developments highlight the critical role of organizational learning in enabling healthcare institutions to develop sustainable human resources capable of functioning effectively in technologically advanced and rapidly evolving environments.

Organizational learning also plays a central role in enhancing employee engagement, empowerment, and intrinsic motivation, which are key determinants of sustainable workforce development. Learning-oriented organizational environments foster psychological empowerment by providing employees with opportunities for skill development, participation in decision-making, and professional growth (Ali et al., 2025; Kranthi et al., 2024). These conditions enhance employee motivation, job satisfaction, and organizational commitment, which in turn contribute to sustainable human resource development. Furthermore, organizational learning facilitates knowledge sharing and collaboration, which are essential for improving workforce competence and organizational effectiveness (Riva'i & Sukarno, 2024; Smith et al., 2024). Learning-oriented organizational cultures encourage employees to actively engage in continuous improvement processes, thereby strengthening the sustainability of human resource development initiatives.

In addition to organizational learning, innovation represents a critical determinant of sustainable human resource development. Organizational innovation involves the development and implementation of new ideas, processes, technologies, and management practices that enhance organizational effectiveness and adaptability. Innovation enables organizations to improve operational efficiency, enhance service quality, and respond effectively to environmental and technological changes (Takeed et al., 2025; Westover, 2024). In healthcare settings, innovation is particularly important for improving clinical outcomes, enhancing operational efficiency, and ensuring the sustainability of healthcare delivery systems. Innovative organizations are better equipped to develop adaptive workforce capabilities, implement new technologies, and create sustainable organizational environments that support continuous human resource development.

Organizational learning and innovation are closely interrelated processes that jointly contribute to sustainable human resource development. Organizational learning provides the knowledge foundation necessary for innovation, while innovation creates new opportunities for learning and organizational development. Learning-oriented organizations are more likely to engage in innovative practices because they possess the cognitive and cultural capabilities necessary to generate and implement new ideas (Dittmar, 2025; Tan et al., 2025). Furthermore, innovation enhances organizational sustainability by enabling organizations to develop environmentally responsible practices, improve operational efficiency, and enhance workforce adaptability (Marini, 2024; Zameer et al., 2024). These processes contribute to the development of sustainable human resource systems capable of supporting long-term organizational success.

The role of organizational learning in fostering innovation has been extensively documented in contemporary organizational research. Organizational learning enhances employees' ability to generate creative ideas, engage in innovative behaviors, and adapt to organizational changes (Qadaar et al., 2024; Reyes-Sánchez, 2025). Learning-oriented organizations create environments that encourage experimentation, creativity, and continuous improvement, which are essential for sustaining innovation and workforce development. Additionally, organizational learning enhances organizational resilience by enabling organizations to effectively respond to crises, adapt to environmental changes, and maintain workforce stability (Jiao & Bu, 2024; Keskin & Palaz, 2024). These capabilities are particularly important in healthcare organizations, where rapid technological change, evolving clinical practices, and environmental uncertainties require continuous workforce adaptation and learning.

Sustainable human resource development also involves promoting environmental responsibility, social equity, and ethical organizational practices. Organizations that prioritize sustainability-oriented human resource development focus on enhancing workforce well-being, promoting equitable employment practices, and supporting environmental sustainability initiatives. Organizational learning plays a critical role in promoting sustainability by enabling employees to develop environmental awareness, adopt sustainable practices, and contribute to organizational sustainability goals (Sadrkhanian, 2024; Zameer et al., 2024). Furthermore, organizational learning facilitates moral and ethical development within organizations, enabling employees to develop ethical awareness and engage in responsible organizational behavior (Kornberger & Leixnering, 2025). These capabilities contribute to the development of sustainable human resource systems that support long-term organizational sustainability.

Leadership and organizational culture also play critical roles in facilitating organizational learning and innovation.

Leadership practices that promote learning, innovation, and employee development enhance organizational capacity for sustainable human resource development. Transformational and learning-oriented leadership practices encourage employees to engage in continuous learning, participate in innovation processes, and develop adaptive competencies (Park & Rahman, 2024; Renalwin, 2025). Furthermore, leadership practices that promote trust, collaboration, and employee engagement enhance organizational learning effectiveness and workforce development (Tafakori, 2025). Organizational cultures that prioritize learning, innovation, and knowledge sharing create environments that support sustainable human resource development and organizational sustainability.

The relationship between organizational learning, innovation, and human resource development has become increasingly important in contemporary organizational environments characterized by rapid technological advancement, globalization, and sustainability challenges. Organizations that effectively integrate learning and innovation into their human resource development strategies are better positioned to enhance workforce competence, improve organizational performance, and achieve long-term sustainability (Maulani, 2024; Qaddafi et al., 2024). Sustainable human resource development enables organizations to develop adaptive workforce capabilities, enhance organizational resilience, and improve organizational performance. In healthcare settings, sustainable human resource development is particularly important because healthcare organizations must continuously adapt to evolving clinical practices, technological innovations, and environmental challenges.

Despite the recognized importance of organizational learning and innovation for sustainable human resource development, many healthcare organizations continue to face challenges in effectively integrating learning and innovation into their human resource management systems. Bureaucratic structures, resource constraints, and resistance to change can limit organizational capacity for learning and innovation, thereby hindering sustainable human resource development (Park & Rahman, 2024; Schneider, 2024). Furthermore, the complexity of healthcare organizations and the diversity of healthcare workforce roles require comprehensive and integrated approaches to human resource development that incorporate learning, innovation, and sustainability principles.

Given the increasing importance of sustainability, innovation, and organizational learning in healthcare organizations, it is essential to examine the relationships among these variables in order to develop effective strategies for sustainable human resource development. Understanding how organizational learning and innovation influence sustainable human resource development can provide valuable insights for healthcare administrators and policymakers seeking to enhance workforce sustainability and organizational performance. Therefore, the aim of this study is to investigate the impact of organizational learning and innovation on sustainable human resource development in hospitals of Kermanshah.

2 Methods and Materials

The present study was conducted with an applied objective and employed a descriptive–correlational research design using structural equation modeling (SEM) to examine the relationships among organizational learning, organizational innovation, and sustainable human resource development. This methodological approach was selected because structural equation modeling enables the simultaneous examination of multiple latent constructs and their causal relationships, thereby providing a comprehensive analytical framework for evaluating complex organizational phenomena. The study was carried out during the year 2023 among employees working in hospitals affiliated with Kermanshah University of Medical Sciences and hospitals under the Social Security Organization in Kermanshah Province, Iran. These hospitals represent the major public healthcare institutions in the region and encompass diverse professional roles, including clinical staff, administrative personnel, technical staff, and managerial employees, thereby providing a comprehensive representation of organizational functioning within healthcare settings.

The statistical population consisted of all employees working in the selected hospitals, totaling 2,560 individuals. To determine the appropriate sample size, Cochran's sample size formula was used, considering a confidence level of 95 percent and a margin of error of 5 percent. Based on this calculation, the required sample size was estimated to be 335 participants. In order to compensate for potential non-response or incomplete questionnaires, a total of 380 questionnaires were distributed among eligible participants. After the data collection process was completed, 328 questionnaires were returned and deemed complete and suitable for statistical analysis, resulting in a response rate of

approximately 86.3 percent, which is considered adequate for structural equation modeling studies.

Sampling was performed using a stratified random sampling method with proportional allocation. In this approach, the study population was first divided into strata based on organizational affiliation, including hospitals affiliated with Kermanshah University of Medical Sciences and hospitals affiliated with the Social Security Organization. Then, participants were randomly selected from each stratum in proportion to its size in the overall population, ensuring that the sample accurately reflected the demographic and organizational composition of the target population. This sampling strategy enhanced the representativeness and generalizability of the findings by reducing sampling bias and ensuring proportional inclusion of employees from different organizational units, educational levels, age groups, and professional backgrounds.

Data were collected using a researcher-developed questionnaire designed specifically for this study, based on established theoretical frameworks and validated measurement models in the fields of organizational learning, organizational innovation, and sustainable human resource development. The questionnaire consisted of four main sections and included a total of 68 items. The first section collected demographic information, including variables such as gender, age, level of education, work experience, and organizational affiliation. These variables were included to provide a comprehensive description of the sample characteristics and to allow for contextual interpretation of the results.

The second section measured organizational learning and consisted of 20 items based on Senge's organizational learning model. This scale assessed five key components of organizational learning, including personal mastery, mental models, shared vision, team learning, and systems thinking, with each component measured using four items. Personal mastery referred to the continuous process of individual learning and self-improvement within the organization. Mental models assessed employees' cognitive frameworks and underlying assumptions that influence organizational behavior. Shared vision measured the extent to which employees collectively understand and support organizational goals. Team learning evaluated collaborative learning processes within workgroups. Systems thinking assessed the ability of employees to understand organizational processes holistically and recognize interrelationships among different organizational elements.

The third section measured organizational innovation and included 15 items based on Damanpour's organizational innovation model. This construct was measured across three components: technological innovation, administrative innovation, and process innovation. Technological innovation referred to the introduction and implementation of new technologies in organizational operations. Administrative innovation involved changes in organizational structures, policies, and management practices. Process innovation assessed improvements in work procedures and operational methods designed to enhance organizational efficiency and effectiveness.

The fourth section measured sustainable human resource development and included 25 items based on Ehnert's sustainable HR development framework. This construct was assessed across three dimensions: economic sustainability, social sustainability, and environmental sustainability. The economic dimension evaluated organizational practices that contribute to long-term economic efficiency and workforce productivity. The social dimension assessed organizational practices that promote employee well-being, social responsibility, fairness, and ethical treatment. The environmental dimension evaluated organizational efforts to promote environmental responsibility and sustainability through human resource policies and practices.

All questionnaire items were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). This scaling method was selected because it allows respondents to express varying levels of agreement and provides sufficient variability for advanced statistical analysis. The questionnaire was administered in Persian, and respondents were assured of the confidentiality and anonymity of their responses in order to encourage honest and accurate reporting.

The validity and reliability of the instrument were rigorously evaluated prior to data analysis. Content validity was assessed by a panel of 10 experts in the fields of management, healthcare administration, and organizational behavior. These experts evaluated the clarity, relevance, and appropriateness of each item. The content validity index (CVI) for the overall questionnaire was 0.92, indicating excellent content validity. Furthermore, the item-level content validity index (I-CVI) for all individual items exceeded the acceptable threshold of 0.78, confirming the adequacy of each item in measuring its intended construct.

Construct validity was examined using confirmatory factor analysis (CFA). The results indicated that all measurement items had standardized factor loadings greater

than 0.70, demonstrating strong relationships between observed indicators and their respective latent constructs. The average variance extracted (AVE) values for all constructs exceeded the recommended threshold of 0.50, indicating adequate convergent validity. Composite reliability (CR) values for all constructs were above 0.80, confirming the internal consistency and reliability of the measurement model.

Reliability was further assessed using Cronbach's alpha coefficient and composite reliability indices. Cronbach's alpha values for organizational learning, organizational innovation, and sustainable human resource development were 0.92, 0.90, and 0.95, respectively, indicating excellent internal consistency. Composite reliability values were also above 0.90 for all constructs, further confirming the reliability and stability of the measurement instrument.

Data analysis was conducted using a combination of SPSS version 26 and SmartPLS version 4 software packages. Initially, descriptive statistical analysis was performed using SPSS to summarize the demographic characteristics of participants and to calculate measures of central tendency and dispersion, including means, standard deviations, frequencies, and percentages. These descriptive statistics provided an overview of the sample characteristics and ensured that the data met basic statistical assumptions.

Following descriptive analysis, confirmatory factor analysis was conducted using SmartPLS to evaluate the measurement model and to assess construct validity and reliability. The evaluation of the measurement model included examination of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Indicator reliability was assessed based on standardized factor loadings, with values greater than 0.70 considered acceptable. Internal consistency reliability was evaluated using Cronbach's alpha and composite reliability indices. Convergent validity was assessed using the average variance extracted, with values greater than 0.50 indicating adequate convergence. Discriminant validity was assessed using the Fornell–Larcker criterion and cross-loading analysis to ensure that each construct was distinct from other constructs in the model.

After confirming the adequacy of the measurement model, structural equation modeling was performed to evaluate the structural relationships among organizational learning, organizational innovation, and sustainable human resource development. Structural model evaluation included examination of path coefficients, t-values, and significance levels obtained through bootstrapping procedures. The bootstrapping method was performed using 5,000 resamples to generate robust estimates of standard errors and to test the statistical significance of hypothesized relationships.

In addition, the coefficient of determination (R^2) was calculated to assess the explanatory power of the model in predicting sustainable human resource development. Effect size (f^2) and predictive relevance (Q^2) indices were also examined to evaluate the strength and predictive capability of the structural model. Model fit was assessed using standard indices appropriate for partial least squares structural equation modeling, ensuring that the model adequately represented the observed data.

3 Findings and Results

The demographic characteristics of the participants indicated a diverse and representative distribution across age, educational level, and work experience categories. In terms of age, the largest proportion of participants were between 35 and 40 years old, accounting for 33.2% (n = 130) of the sample, followed by those aged over 40 years, representing 24.7% (n = 97). Participants aged between 30 and 35 years comprised 23.7% (n = 93) of the sample, while those aged between 25 and 30 years accounted for 13.3% (n = 52). The smallest age group included participants younger than 25 years, representing only 5.1% (n = 20) of the total sample. Regarding educational level, the majority of participants held a bachelor's degree, accounting for 51.0% (n = 200), followed by those with a master's degree, representing 48.0% (n = 188). Only a small proportion of participants held a doctoral degree, accounting for 1.0% (n = 4). In terms of work experience, the largest group of participants had between 10 and 20 years of work experience, comprising 33.7% (n = 132) of the sample. This was followed by participants with 5 to 10 years of experience, representing 26.8% (n = 105), and those with 2 to 5 years of experience, accounting for 18.6% (n = 73). Participants with more than 20 years of work experience constituted 12.5% (n = 49), while those with less than 2 years of experience represented the smallest group, accounting for 8.4% (n = 33). Overall, the demographic profile of the participants indicates that the sample primarily consisted of mid-career professionals with substantial educational qualifications and considerable work experience, which enhances the reliability and relevance of the study findings in reflecting organizational dynamics within hospital settings.

Table 1

Descriptive Statistics of Sustainable Human Resource Development Model Components

Component	Minimum Score	Maximum Score	Mean	Standard Deviation
Empowerment and Skill Development	1.17	5.00	3.369	0.796
Workforce Diversity and Equity	1.50	5.00	3.432	0.799
Social Development Participation	1.00	5.00	3.443	0.844
Sustainable Quality of Work Life Improvement	1.00	5.00	3.121	0.901
Sustainable Human Resource Development	1.00	5.00	2.773	0.917
Environmental Commitment and Training	1.00	5.00	3.100	0.823
Sustainable Learning and Innovation	1.00	5.00	3.150	0.827
Green Human Resource Governance and Leadership	1.00	5.00	3.307	0.810

The descriptive statistics presented in Table 1 indicate that all components of the sustainable human resource development model were evaluated at moderate levels among hospital employees, with mean scores generally above the midpoint of the five-point Likert scale. Among the components, social development participation had the highest mean score (M = 3.443, SD = 0.844), indicating that employees perceived relatively favorable conditions in terms of their involvement in socially oriented developmental processes within the organization. This was followed closely by workforce diversity and equity (M = 3.432, SD = 0.799) and empowerment and skill development (M = 3.369, SD = 0.796), suggesting that hospitals demonstrated moderate effectiveness in promoting employee capability enhancement and equitable human resource practices. Green human resource governance and leadership also showed a moderate mean score (M = 3.307, SD = 0.810), reflecting an acceptable level of sustainability-oriented leadership and governance practices. Sustainable learning and innovation (M = 3.150, SD = 0.827) and environmental commitment and training (M = 3.100, SD = 0.823) also fell within the moderate range, indicating that sustainability-related learning and environmental training initiatives were present but not fully optimized. Sustainable quality of work life improvement showed a slightly lower mean score (M = 3.121, SD = 0.901), suggesting room for improvement in ensuring long-term employee well-being and job satisfaction. Notably, sustainable human resource development had the lowest mean score among all components (M = 2.773, SD = 0.917), indicating that while sustainability-oriented HR development practices existed, they were relatively less developed compared to other components. Overall, the findings suggest that although hospitals in Kermanshah demonstrate moderate progress in implementing sustainable human resource development practices, there remains significant potential for strengthening sustainability-oriented HR strategies, particularly in enhancing long-term workforce development and sustainability integration.

Table 2

Composite Reliability of the Outer Measurement Models

Variable	Composite Reliability (CR)	Composite Reliability (Rho)
Empowerment and Skill Development	0.875	0.888
Workforce Diversity and Equity	0.864	0.875
Social Development Participation	0.812	0.821
Sustainable Quality of Work Life Improvement	0.875	0.908
Sustainable Human Resource Development	0.820	0.859
Environmental Commitment and Training	0.794	0.819
Sustainable Learning and Innovation	0.814	0.817
Green Human Resource Governance and Leadership	0.850	0.863

The results presented in Table 2 indicate that the composite reliability values for all constructs in the measurement model exceeded the minimum acceptable threshold of 0.70, demonstrating strong internal consistency and reliability of the latent variables. Specifically, the composite reliability (CR) values ranged from 0.794 for

environmental commitment and training to 0.875 for empowerment and skill development and sustainable quality of work life improvement. Similarly, composite reliability (Rho) values ranged from 0.817 to 0.908, further confirming the robustness of the measurement model. The highest reliability was observed for sustainable quality of work life improvement (Rho = 0.908), indicating excellent internal consistency among its measurement indicators. These findings confirm that all constructs were measured reliably and consistently, supporting the suitability of the measurement model for subsequent structural equation modeling analysis.

Table 3

Convergent Validity Indices (Average Variance Extracted – AVE)

Variable	AVE
Empowerment and Skill Development	0.641
Workforce Diversity and Equity	0.617
Social Development Participation	0.622
Sustainable Quality of Work Life Improvement	0.591
Sustainable Human Resource Development	0.538
Environmental Commitment and Training	0.694
Sustainable Learning and Innovation	0.667
Green Human Resource Governance and Leadership	0.633

The convergent validity results presented in Table 3 demonstrate that all constructs achieved acceptable levels of convergent validity. The average variance extracted (AVE) values ranged from 0.538 to 0.694, exceeding the recommended minimum threshold of 0.50. The highest AVE value was observed for environmental commitment and training (AVE = 0.694), indicating that this construct explained a substantial proportion of variance in its measurement indicators. Similarly, sustainable learning and innovation (AVE = 0.667) and green human resource governance and leadership (AVE = 0.633) also demonstrated strong convergent validity. Even the lowest AVE value, observed for sustainable human resource development (AVE = 0.538), remained above the acceptable threshold, confirming adequate convergent validity. Overall, these findings indicate that the measurement indicators adequately represent their respective latent constructs, confirming the validity of the measurement model.

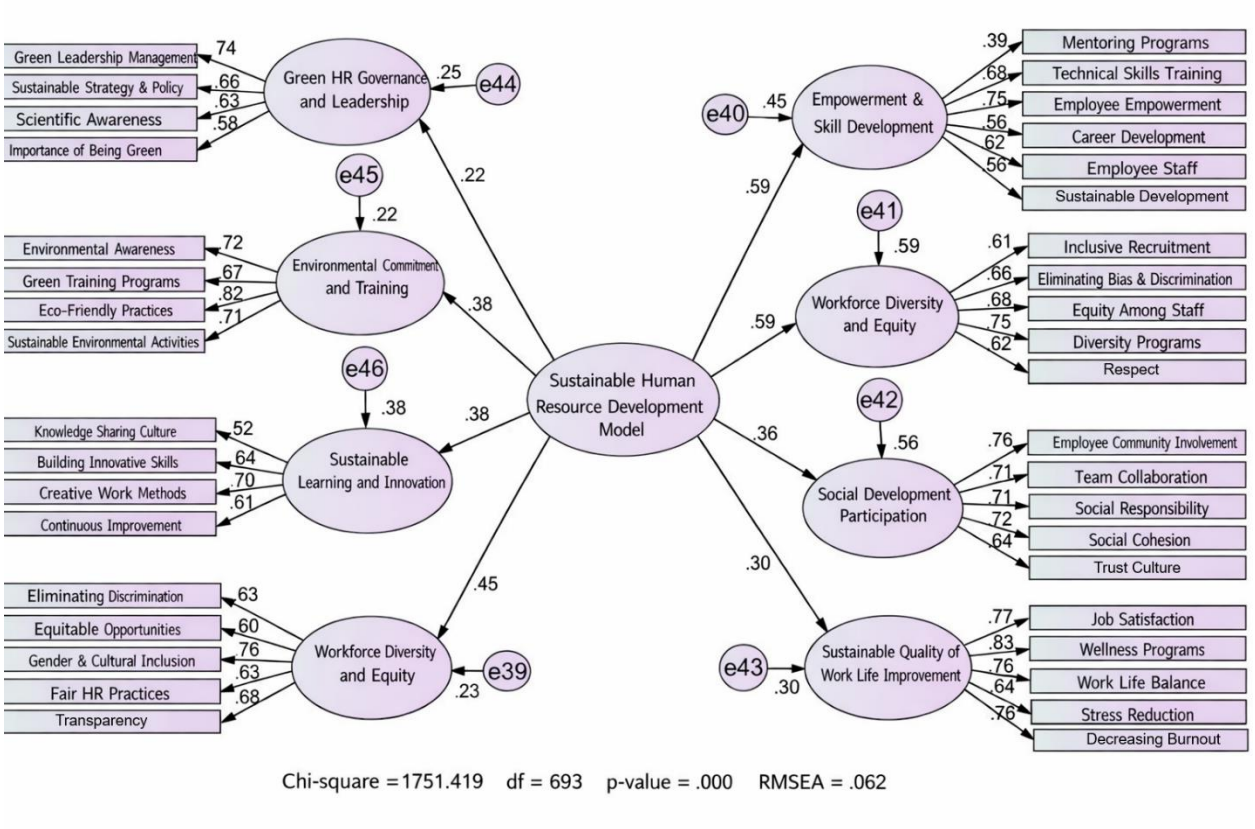
Table 4

Heterotrait–Monotrait Ratio (HTMT) for Discriminant Validity

Variable	1	2	3	4	5	6	7	8
1. Empowerment and Skill Development	—							
2. Workforce Diversity and Equity	0.645	—						
3. Social Development Participation	0.786	0.732	—					
4. Sustainable Quality of Work Life Improvement	0.680	0.390	0.491	—				
5. Sustainable Human Resource Development	0.411	0.371	0.694	0.420	—			
6. Environmental Commitment and Training	0.393	0.280	0.556	0.517	0.307	—		
7. Sustainable Learning and Innovation	0.570	0.395	0.573	0.539	0.410	0.670	—	
8. Green Human Resource Governance and Leadership	0.726	0.649	0.763	0.389	0.525	0.486	0.671	—

Figure 1

Final Model of The Study



The discriminant validity of the measurement model was evaluated using the heterotrait–monotrait ratio (HTMT), as presented in Table 4. The HTMT values for all construct pairs were below the recommended threshold of 0.90, indicating adequate discriminant validity. The highest HTMT value was observed between social development participation and green human resource governance and leadership (HTMT = 0.763), which remained well below the critical threshold, confirming that these constructs are conceptually distinct despite their moderate association. Similarly, other construct pairs showed HTMT values ranging from 0.280 to 0.786, indicating acceptable levels of discriminant validity. These findings confirm that each construct in the model captures a unique aspect of sustainable human resource development and that there is no significant overlap between constructs. Overall, the results provide strong evidence supporting the reliability and validity of the measurement model, thereby confirming its suitability for structural equation modeling and hypothesis testing.

Table 5

Structural Model Test of the Sustainable Human Resource Development Model

Component	Unstandardized Coefficient	R^2	t-value	p-value
Empowerment and Skill Development	0.421	0.075	5.647	0.001
Workforce Diversity and Equity	0.444	0.078	5.684	0.001
Social Development Participation	0.597	0.085	7.008	0.001
Sustainable Quality of Work Life Improvement	0.638	0.098	6.497	0.001
Sustainable Human Resource Development	0.888	0.105	8.490	0.001
Environmental Commitment and Training	0.467	0.081	5.801	0.001
Sustainable Learning and Innovation	0.685	0.100	6.854	0.001
Green Human Resource Governance and Leadership	0.655	0.088	7.403	0.001

The results presented in Table 5 indicate that all components of the sustainable human resource development model had statistically significant relationships with the overall sustainable human resource development construct. Specifically, all path coefficients were positive and statistically significant at the 0.001 level, indicating strong empirical support for the proposed structural model. Among the components, sustainable human resource development demonstrated the strongest effect on the overall model, with the highest unstandardized coefficient ($\beta = 0.888$), t-value ($t = 8.490$), and coefficient of determination ($R^2 = 0.105$), indicating that this component plays a central and influential role in shaping sustainability-oriented human resource improvement. Sustainable learning and innovation also showed a strong and significant effect ($\beta = 0.685$, $t = 6.854$, $R^2 = 0.100$), highlighting the importance of continuous learning and innovation in promoting sustainable workforce development. Similarly, green human resource governance and leadership had a substantial and statistically significant effect ($\beta = 0.655$, $t = 7.403$, $R^2 = 0.088$), emphasizing the critical role of sustainability-oriented leadership in guiding human resource development practices. Sustainable quality of work life improvement ($\beta = 0.638$, $t = 6.497$, $R^2 = 0.098$) and social development participation ($\beta = 0.597$, $t = 7.008$, $R^2 = 0.085$) also demonstrated strong and significant contributions, indicating that employee well-being and social engagement are essential components of sustainable human resource development. Environmental commitment and training ($\beta = 0.467$, $t = 5.801$, $R^2 = 0.081$), workforce diversity and equity ($\beta = 0.444$, $t = 5.684$, $R^2 = 0.078$), and empowerment and skill development ($\beta = 0.421$, $t = 5.647$, $R^2 = 0.075$) also had statistically significant effects, although their relative impact was somewhat lower compared to other components. Nevertheless, their significant t-values and positive coefficients confirm their important contributions to the overall sustainable human resource development framework. Overall, the structural model results confirm that all eight components play meaningful and statistically significant roles in improving sustainable human resource development in hospital settings, thereby validating the proposed model and highlighting the multidimensional nature of sustainability-oriented human resource management.

4 Discussion

The present study aimed to investigate the impact of organizational learning and innovation on sustainable human resource development in hospitals of Kermanshah, and the findings provided strong empirical support for the proposed structural model. The results indicated that organizational learning and innovation-related components, including empowerment and skill development, workforce diversity and equity, social development participation, sustainable quality of work life improvement, environmental commitment and training, sustainable learning and innovation, and green human resource governance and leadership, all had significant and positive effects on sustainable human resource development. These findings highlight the multidimensional nature of sustainable human resource development and emphasize the critical role of organizational learning and innovation in fostering workforce sustainability in healthcare settings. The significant effects observed across all components suggest that sustainable human resource development is not driven by a single factor but rather emerges from an integrated system of learning-oriented practices, innovation-driven initiatives, sustainability-oriented leadership, and workforce empowerment strategies.

One of the most important findings of this study was the significant impact of empowerment and skill development on sustainable human resource development. This finding confirms that when employees are provided with opportunities for skill acquisition, professional growth, and competency development, they become more capable of adapting to organizational changes and contributing to long-term organizational sustainability. This result is consistent with previous research demonstrating that organizational learning enhances employee competencies and promotes workforce adaptability, which are essential for sustainable human resource development (Järvenpää et al., 2025; Witt et al., 2024). Organizational learning environments create opportunities for employees to continuously improve their skills, develop new competencies, and engage in adaptive learning processes, thereby strengthening workforce sustainability. Furthermore, learning-oriented environments enhance psychological empowerment, which increases employees' motivation, engagement, and commitment to organizational goals (Ali et al., 2025; Kranthi et al., 2024). This indicates that empowering employees through learning and development initiatives is a critical mechanism for ensuring sustainable human resource development in healthcare organizations.

The findings also revealed that workforce diversity and equity had a significant positive effect on sustainable human resource development. This result highlights the importance

of inclusive organizational environments that promote fairness, equal opportunities, and respect for diversity. Diversity-oriented human resource practices enhance organizational learning by facilitating knowledge sharing among employees with different perspectives, experiences, and competencies. Diverse and inclusive workplaces create environments that encourage creativity, innovation, and collaborative learning, thereby enhancing organizational adaptability and sustainability (Chinchilla & Grau, 2025; Smith et al., 2024). Furthermore, equitable human resource practices enhance employee engagement, job satisfaction, and organizational commitment, which contribute to sustainable workforce development (Renalwin, 2025; Riva'i & Sukarno, 2024). These findings suggest that diversity and equity practices are essential components of sustainability-oriented human resource development strategies.

Another important finding was the significant impact of social development participation on sustainable human resource development. This finding indicates that employee participation in organizational and social development processes enhances workforce sustainability by strengthening employee engagement, organizational commitment, and collaborative learning. Participation-oriented organizational environments encourage employees to actively contribute to organizational improvement, share knowledge, and engage in problem-solving activities. These processes enhance organizational learning capacity and workforce adaptability, which are essential for sustainable human resource development (Qaddafi et al., 2024; Reyes-Sánchez, 2025). Moreover, employee participation enhances organizational innovation by facilitating the exchange of ideas and promoting collaborative innovation processes (Takeed et al., 2025). These findings confirm that participatory organizational environments play a critical role in fostering sustainable human resource development.

The results also demonstrated that sustainable quality of work life improvement had a significant positive effect on sustainable human resource development. This finding highlights the importance of promoting employee well-being, work-life balance, and job satisfaction as essential components of sustainable workforce development. Sustainable human resource development requires organizational environments that support employee physical, psychological, and emotional well-being. Organizational learning environments contribute to improved quality of work life by providing employees with opportunities for growth, recognition, and professional development (Sadrkhanian, 2024; Westover, 2024). Furthermore, organizations that prioritize employee well-being are more likely to retain skilled employees, enhance workforce stability, and promote long-term organizational sustainability (Schneider, 2024). These findings confirm that quality of work life improvement is a critical determinant of sustainable human resource development.

Environmental commitment and training also had a significant positive effect on sustainable human resource development, highlighting the importance of sustainability-oriented learning and environmental awareness initiatives. Environmental training programs enhance employees' understanding of sustainability principles and encourage the adoption of environmentally responsible behaviors. Organizational learning plays a critical role in promoting environmental awareness and facilitating the adoption of sustainable practices (Marini, 2024; Zameer et al., 2024). Furthermore, sustainability-oriented learning initiatives enable organizations to develop environmentally responsible human resource systems that support long-term organizational sustainability. These findings confirm that environmental commitment and training are essential components of sustainable human resource development in healthcare organizations.

The study also found that sustainable learning and innovation had a strong and significant effect on sustainable human resource development. This finding confirms that innovation-driven learning environments enhance workforce adaptability, creativity, and organizational resilience. Organizational learning provides the knowledge foundation necessary for innovation, while innovation enhances organizational capacity for continuous learning and adaptation (Dittmar, 2025; Tan et al., 2025). Innovative organizations create environments that encourage experimentation, creativity, and continuous improvement, thereby enhancing workforce sustainability (Meher et al., 2024; Qadaar et al., 2024). Furthermore, innovation enhances organizational resilience by enabling organizations to adapt to environmental changes and respond effectively to emerging challenges (Jiao & Bu, 2024; Keskin & Palaz, 2024). These findings highlight the critical role of innovation in fostering sustainable human resource development.

Green human resource governance and leadership also had a significant positive effect on sustainable human resource development, highlighting the importance of sustainability-oriented leadership practices. Leadership plays a critical role in shaping organizational learning environments, promoting innovation, and supporting

workforce development. Leadership practices that promote learning, innovation, and sustainability enhance organizational capacity for sustainable human resource development (Park & Rahman, 2024; Renalwin, 2025). Furthermore, sustainability-oriented leadership promotes ethical organizational practices, environmental responsibility, and workforce sustainability (Kornberger & Leixnering, 2025). These findings confirm that leadership is a critical driver of sustainable human resource development in healthcare organizations.

5 Conclusion

Overall, the findings of this study confirm that organizational learning and innovation play central roles in promoting sustainable human resource development in healthcare settings. Organizational learning enhances employee competencies, promotes workforce adaptability, and supports innovation-driven workforce development. Innovation enhances organizational adaptability, promotes continuous improvement, and strengthens organizational sustainability. These findings are consistent with previous research demonstrating that organizational learning enhances workforce development, organizational resilience, and long-term organizational sustainability (Sun, 2025; Witt et al., 2024). Furthermore, technological advancements and digital learning systems have further enhanced organizational capacity for sustainable workforce development by facilitating continuous learning and competency development (Olusegun et al., 2024; Slatvinskyi, 2025). These findings highlight the importance of integrating organizational learning and innovation into human resource management strategies to promote sustainable workforce development.

The findings of this study also have important implications for healthcare organizations seeking to enhance workforce sustainability and organizational performance. Healthcare organizations operate in complex and rapidly changing environments that require continuous workforce adaptation and innovation. Organizational learning and innovation provide mechanisms for enhancing workforce adaptability, improving organizational performance, and promoting sustainability. By fostering learning-oriented organizational cultures, promoting innovation-driven workforce development, and implementing sustainability-oriented leadership practices, healthcare organizations can enhance workforce sustainability and improve long-term organizational performance.

One limitation of this study was that the data were collected using a cross-sectional research design, which limits the ability to establish causal relationships among the studied variables. Although structural equation modeling provides strong statistical evidence of relationships among variables, longitudinal studies would provide more robust evidence regarding causal relationships and temporal dynamics. Additionally, the study relied on self-reported questionnaire data, which may be subject to response bias, including social desirability bias and common method variance. Furthermore, the study was conducted within hospitals in a single geographic region, which may limit the generalizability of the findings to other healthcare systems or organizational contexts.

Future research should employ longitudinal research designs to examine the long-term effects of organizational learning and innovation on sustainable human resource development. Longitudinal studies would provide deeper insights into how learning and innovation processes evolve over time and influence workforce sustainability. Future research should also examine the role of moderating variables such as organizational culture, leadership style, and technological readiness in shaping the relationship between organizational learning, innovation, and sustainable human resource development. Additionally, comparative studies across different healthcare systems, regions, and organizational types would enhance the generalizability of the findings and provide broader insights into sustainable workforce development.

Healthcare organizations should prioritize the development of learning-oriented organizational cultures that promote continuous employee development, innovation, and sustainability. Healthcare administrators should implement training programs, innovation initiatives, and leadership development programs that enhance workforce competencies and promote sustainability-oriented organizational practices. Furthermore, healthcare organizations should create supportive work environments that promote employee well-being, engagement, and participation in organizational development processes. By integrating organizational learning, innovation, and sustainability principles into human resource management practices, healthcare organizations can enhance workforce sustainability and improve organizational performance.

Authors' Contributions

S.K. supervised the overall research process and coordinated implementation within hospital settings. A.B.N. developed the methodology, designed the measurement model, and performed structural equation modeling and statistical analyses using SPSS and SmartPLS. H.R.M. contributed to data collection, instrument development, and validation procedures. S.S. prepared the original manuscript draft and contributed to data interpretation and manuscript revision. All authors reviewed, revised, and approved the final version of the manuscript.

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

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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