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**Research Article**

# Analysing Green Human Resource Management In Indian Healthcare: Integrating FDPM And DEMATEL Approaches To Assess Factors Influencing Sustainability Impacts

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**ABSTRACT**

This study delves into the potential benefits of green human resource management (GHRM) in improving sustainability in the Indian healthcare industry, using a sample of 30 human resource managers from hospitals. The research assesses crucial GHRM components such as green performance management, green hiring, green training and development, green compensation, and the development of an eco-friendly organisational culture and employee empowerment, using the fuzzy Delphi method and Decision-Making Trial and Evaluation Laboratory approaches. The findings reveal that these factors have a hierarchical impact on sustainable practices, with performance management and compensation playing a critical role. The Ability-Motivation-Opportunity theory, which frames the analysis of how GHRM practices enhance employees' competencies, motivation, and opportunities to contribute to environmental goals, provides the theoretical foundation for this analysis. The findings underscore the potential of GHRM in achieving more general sustainability goals and offer healthcare managers valuable insights into prioritising human resource strategies.

**Keywords:** Green human resource management (GHRM), Fuzzy Delphi method (FDPM), Fuzzy DEMATEL (FDM), Ability Motivation Opportunity theory (AMO)

## 1. Introduction

The healthcare sector's impact on global emissions is significant, ranking as the fifth-largest emitter worldwide. Reports by Health Care Without Harm and Arup (2019) indicate that healthcare contributes 4.4% of global net emissions, with the Indian sector accounting for about 2%. With emissions from this sector increasing annually by 5% and India's commitment to achieving net-zero emissions by 2070, the urgency for immediate and effective climate change mitigation strategies is paramount and a pressing need (The Times of India, 2022). Simultaneously, projections indicate that the Indian healthcare industry will reach USD 372 billion in 2022, growing at an annual rate of 22% since 2016.

As a major employer, it is expected to add 2.7 million jobs from 2017 to 2022, marking it as a pivotal player in India's economic and employment landscape (NITI Aayog, 2021). The necessity of integrating sustainability into healthcare aligns with the Sustainable Development Goals (SDGs) for 2030, emphasising environmental, economic, and social dimensions in healthcare operations. The importance of sustainable business practices is increasingly recognised across various industries, driven by environmental degradation and the need for climate resilience (Himani et al., 2023; Das, 2023; Amit et al., 2022). In this context, green-green human resource management (GHRM) serves as a critical strategy. GHRM involves HR practices that foster resource conservation, waste reduction, and a culture of sustainability, thereby enhancing organisational efficiency and employee engagement in environmental initiatives (Ren et al., 2017; Guerci et al., 2016; Hussain, 2018).

While GHRM has gained traction in developed nations, its implementation in developing countries like India offers fertile ground for exploration. Research suggests that GHRM significantly improves environmental performance, promoting green innovation and pro-environmental behaviour among healthcare employees (Aftab et al., 2022; Mukherji & Bhatnagar, 2022). However, a gap persists in understanding its impact on sustainable healthcare performance, particularly in developing contexts (Mousa & Othman, 2020). Furthermore, this research is timely and critical, especially in the post-pandemic era, as it contributes to understanding how GHRM influences environmental awareness and the psychological well-being of healthcare employees. With healthcare sustainability as the ultimate goal, this study underscores the necessity of prioritising GHRM strategies to achieve sustainable outcomes that benefit both the environment and healthcare service quality (Das and Dash, 2022; Mehra & Sharma, 2021; Aggarwal et al., 2023).

Ability-Motivation-Opportunity (AMO) theory provided the framework to understand how ability, motivation, and opportunity affect workplace sustainability. This study addresses the research gap by examining how green hiring (GH), green training and involvement (GTI), green performance management and compensation (GPMC), eco-friendly behaviour (GHCB), and empowerment of employees (EE) improve sustainability in India's healthcare sector. This study uses fuzzy Delphi and DEMATEL, which are used in many decision-making studies. Fuzzy Delphi utilises expert consensus to create indicators (Ruano et al., 2023), while Fuzzy DEMATEL analyses indicator interdependencies to identify causal relationships (Nguyen & Chu, 2023).

## 2. Literature Review

### 2.1 Green recruitment and selective hiring

Green recruitment and selective hiring are key to advancing environmental sustainability in healthcare organisations. Studies have demonstrated that integrating green criteria in the hiring process leads to better environmental performance, as candidates with pro-environmental behaviours align with and enhance an organisation's sustainability objectives (Tsymbaliuk et al., 2023; Ullah et al., 2022). Furthermore, Abiwu and Nunoo (2021) stress the effectiveness of showcasing a firm's environmental commitments to attract eco-conscious job seekers. By embedding these practices, organisations not only meet their environmental goals but also cultivate a workforce committed to sustainability.

### 2.2 Green development and training

Effective green development and training initiatives bolster organisations' environmental performance. Research indicates that such programs directly enhance employees' eco-friendly behaviours and attitudes, thereby strengthening organisational commitment to sustainability (Mahfuz et al., 2023; Sarwar & Mustafa, 2023; Septiawati et al., 2022). These educational efforts not only elevate individual performance but also reinforce collective environmental stewardship (Yadav & Mathew, 2023). Deshpande and Srivastava (2022) further elucidate that embedding sustainability into training programs is a strategic approach that solidifies an organisation’s green agenda. Moreover, green training's role in cultivating environmentally responsible behaviours demonstrates its integral position in promoting long-term sustainable outcomes within organisations.

### 2.3 Green performance management and compensation

Green performance management and compensation are crucial aspects in the context of promoting sustainability within organisations. The integration of environmental considerations into human resource practices, known as Green HRM, plays a significant role in fostering a culture of sustainability (Djalil, 2022; Que, 2023). Additionally, the implementation of green compensation systems, along with motivation strategies, has been found to enhance employee performance and contribute significantly to overall organisational sustainability (Martins et al., 2021). Studies have shown that green human resource management practices can positively impact sustainable performance in both public and private healthcare organisations. By aligning performance management and compensation with environmental goals, organisations can effectively reduce their negative impact on the environment while improving their economic and social performance (Fapohunda, 2021).

### 2.4 Green Human Resource Culture and Eco-Friendly Behaviour

Green Human Resource Management (GHRM) practices play a significant role in fostering eco-friendly behaviour among employees. Studies indicate that GHRM practices positively influence employee green behaviour by promoting green activities and organisational citizenship behaviour towards the environment (Mostafa & Saleh, 2023; Veerasamy et al., 2023). Additionally, the impact of GHRM practices on pro-environmental behaviour is strengthened by employees' green commitments and attitudes, emphasising the importance of aligning HR initiatives with employees' environmental values (Hayyat et al., 2023). Moreover, the presence of green culture, green transformational leadership, and GHRM positively impact green organisational citizenship behaviour, highlighting the need for a holistic approach towards environmental sustainability within organisations (Alfian et al., 2023). Overall, GHRM, when coupled with a supportive green culture and leadership, can effectively drive employees towards engaging in voluntary workplace green behaviour, contributing to organisational sustainable development (Yuan et al., 2023).

### 2.5 Employee empowerment

Employee empowerment plays a crucial role in the realm of GHRM, as evidenced by various research studies. Studies have shown that Green Employee Empowerment (GEE) acts as a mediator between GHRM practices and green knowledge-sharing behaviours (Veerasamy et al., 2023). Additionally, the interaction between GEE and individual green values (IGV) further enhances green knowledge-sharing behaviours, especially at higher levels of IGV (Rashid et al., 2023). Moreover, Empowering employees through green HRM involves promoting pro-environmental attitudes. The study highlights the significance of green competencies awareness and environmental education by employers for sustainability (Wielewska et al., 2023). These findings underscore the significance of empowering employees through GHRM initiatives to foster green behaviours and overall organisational sustainability.

### 2.6 Theoretical Background

As recommended by Renwick et al. (2013), the study employed used the Ability Motivation Opportunity (AMO) theory (Appelbaum et al., 2000) to present 'GHRM'. AMO theory states that HRM practices improve organisational performance by increasing employees' competencies, motivation, and opportunities to engage in organisation-beneficial behaviours (Jackson et al., 2014). GHRM practices are typically categorised into competence-building through training programs, motivation-enhancing via performance management, and fostering employee involvement in green behaviours through targeted programs. (Pinzone et al., 2016). Considering this perspective, the current research has used aspects and criteria based upon this theory, which were previously unexplored from a fuzzy linguistic perspective. Jiang et al. (2014) suggest that the AMO theory applies conceptually and empirically to organisations, even though it is primarily used at the individual level.

## 3. Research Methodology

### 3.1 Sample Description

In this study, 30 HR professionals from Indian hospitals were sampled. This group was chosen for their HR and sustainability experience in healthcare organisations. Purposeful sampling was used to gain insights from those directly implementing and managing human resource policies and practices, especially those related to healthcare sustainability. Purposive sampling ensured that participants had sufficient GHRM knowledge and experience to provide insightful responses based on their direct experiences (Tongco, 2007). This sampling technique deviates from random sampling by explicitly targeting individuals who possess specific qualities or experiences that match the research objectives (Andrade, 2020).

### 3.2 Data Collection

Multiple online questionnaires were used to collect data for the study; researchers are increasingly using them due to their cost-effectiveness, speed, and convenience (Pitura, 2023). Fuzzy Delphi and DEMATEL experts agreed on key GHRM factors in the questionnaire using the Fuzzy Delphi Method. GHRM elements were refined and prioritised. The FDM questionnaire examined these GHRM factors' relationships and effects. This sequential approach laid the groundwork for understanding GHRM's key components and their dynamic organisational interactions.

### 3.3 Fuzzy Delphi Method

The Delphi technique is a powerful way to solve decision-making problems by seeking consensus among experts. Many construction studies use this method (Hallowell & Gambatese, 2010; Zhang & Mohandas, 2020). The FDPM, originally referred to as the Delphi method, employs fuzzy set theory to address the limitations of expert references and enhance the quality of the questionnaire; this technique is used to validate the suggested attribute based on the linguistic references provided by experts. It offers a robust assessment of streamlining the review process, including reducing the survey length and expenses, without requiring many responses (Bui et al., 2021).

For example, the commission consists of n experts. To begin the analytical process, experts are asked to simultaneously estimate the attribute's importance.$= p(a_{xy}; b_{xy}; c_{xy}), x = 1, 2, 3, \dots, n; y = 1, 2, 3, \dots, m,$ as $p_y$ Is the weight of $y$ presented as $p_y = (a_y; b_y; c_y)$ with $a_y = min(a_{xy}), b_y = \left(\prod_1^n b_{xy}\right)^{1/n}$, and $c_y = max(c_{xy})$. Table 1 explains how the expert's verbal allusions are transformed into fuzzy triangular numbers (TFNs).

**Table 1.** Transformation of linguistic terms for FDPM.

| Linguistic keywords (performance/essential) | Associated triangular fuzzy numbers (TFNs) |
|---|---|
| Very High | (0.75, 1.0, 1.0) |
| High | (0.5, 0.75, 1.0) |
| Normal | (0.25, 0.5, 0.75) |
| Moderate | (0, 0.25, 0.5) |
| Low | (0, 0, 0.25) |

To calculate the convex pairing values $\varepsilon$ , cut as:

$$u_y = a_y - \varepsilon(c_y - b_y),$$

$$p_y = x_y - \varepsilon(b_y - \varepsilon a_y),$$
$$b = 1,2,3,\dots,m \quad (1)$$

Where $\varepsilon =$ [0,1]regarding Expert opinions can be either positive or negative. The $\varepsilon =$ 0.5Is usually enquired as a broad perception condition.

The fuzzy assessment is transformed into precise numbers. $H_y$ As:

$$H_y = \int(u_y, p_y) = \sigma[u_y + (1-\sigma)p_y] \quad (2)$$

where $\sigma$reflects the expert's upbeat viewpoint on the evaluation of the equilibration.

Afterwards, the necessary condition is met as $T = \left(\sum_{y=1}^{m} H_y\right)/m$ To improve the original set's valid qualities.

If $H_y \geq T$, attribute $b$Is valid. If not, it needs to be taken out.

### 3.4 Fuzzy DEMATEL

First used to analyse complex decision-making problems, the DEMATEL technique is now widely used to identify cause-and-effect relationships between various factors (Bavafa et al., 2018). FDM, whichcombines fuzzy set theory and Delphi, addresses subjective judgment influence. The FDM method shows how factors interact and quantifies their influence. This study uses FDM to examine the relationships between various aspects and criteria. Moreover,triangular fuzzy numbers were used to overcome the limitations of precise values in analysis (Tabatabaee et al., 2019).

### 3.6 The Steps of Fuzzy DEMATEL Method

#### 3.6.1 Generate the fuzzy direct-relation matrix.

To identify the model of the relations among the n criteria and aspects, an n × n matrix is first generated. The element's influence in each row exerted on the component of each matrix column can be represented as a fuzzy number. If multiple experts' opinions are used, all experts must complete the matrix. The arithmetic mean of all the experts' opinions generates the direct relation matrix z.

$$z = \begin{bmatrix} 0 & \cdots & \tilde{z}_{n1} \\ \vdots & \ddots & \vdots \\ \tilde{z}_{1n} & \cdots & 0 \end{bmatrix} \quad (3)$$

The table below indicates the direct relation matrix, the same as the experts' pairwise comparison matrix.

**Table 2:** Fuzzy scale used in the model

| Code | Linguistic terms | L | M | U |
|---|---|---|---|---|
| 1 | No influence | 0 | 0 | 0.25 |
| 2 | Very low influence | 0 | 0.25 | 0.5 |
| 3 | Low influence | 0.25 | 0.5 | 0.75 |
| 4 | High influence | 0.5 | 0.75 | 1 |
| 5 | Very high influence | 0.75 | 1 | 1 |

#### 3.6.2: Normalize the fuzzy direct relation matrix

The normalised fuzzy direct-relation matrix can be obtained using the following formula:

$$\tilde{x}_{ij} = \frac{\tilde{z}_{ij}}{r} = \left(\frac{l_{ij}}{r}, \frac{m_{ij}}{r}, \frac{u_{ij}}{r}\right) \quad (4)$$

Where,

$$r = \max_{i,j}\left\{\max_i \sum_{j=1}^{n} u_{ij}, \max_j \sum_{i=1}^{n} u_{ij}\right\} \qquad i,j \in \{1,2,3,\dots,n\} \quad (5)$$

#### 3.6.3 Calculate the fuzzy total-relation matrix

In step 3, the fuzzy total-relation matrix can be calculated by the following formula:

$$\tilde{T} = \lim_{k\to+\infty}(\tilde{x}^1 \oplus \tilde{x}^2 \oplus \dots \oplus \tilde{x}^k) \quad (6)$$

If each element of the fuzzy total-relation matrix is expressed as $\tilde{t}_{ij} = (l''_{ij}, m''_{ij}, u''_{ij})$ , it can be calculated as follows:

$$[l''_{ij}] = x_l \times (I - x_l)^{-1} \quad (7)$$
$$[m''_{ij}] = x_m \times (I - x_m)^{-1}$$
$$[u''_{ij}] = x_u \times (I - x_u)^{-1}$$

In other words, the normalised matrix, the inverse, is first calculated, then subtracted from matrix I, and finally, the normalised matrix is multiplied by the resulting matrix.

#### 3.6.4: Defuzzify into crisp values

The CFCS method proposed by Opricovic and Tzeng has been used to obtain a crisp value of the total-relation matrix. The steps of the CFCS method are as follows:

$$l_{ij}^n = \frac{\left(l_{ij}^t - \min l_{ij}^t\right)}{\Delta_{min}^{max}} \quad (8)$$

$$m_{ij}^n = \frac{(m_{ij}^t - min\ l_{ij}^t)}{\Delta_{min}^{max}}$$

$$u_{ij}^n = \frac{(u_{ij}^t - min\ l_{ij}^t)}{\Delta_{min}^{max}}$$

So that

$$\Delta_{min}^{max} = \max u_{ij}^t - \min l_{ij}^t \quad (9)$$

Calculating the upper and lower bounds of normalised values:

$$l_{ij}^s = {m_{ij}^n}/{(1 + m_{ij}^n - l_{ij}^n)} \quad (10)$$

$$u_{ij}^s = {u_{ij}^n}/{(1 + u_{ij}^n - l_{ij}^n)}$$

The output of the CFCS algorithm is crisp values.
Calculating total normalised crisp values:

$$x_{ij} = \frac{[l_{ij}^s\left(1 - l_{ij}^s\right) + u_{ij}^s \times u_{ij}^s]}{[1 - l_{ij}^s + u_{ij}^s]} \quad (11)$$

### 3.6.5 set the threshold value

The threshold value is needed to calculate the internal relations matrix. Disregard partial relations and plot the network relationship map (NRM). Only relations with matrix T values greater than the threshold are shown in the NRM. The average matrix T values are enough to calculate the relation threshold value. After the threshold intensity is determined, all matrix T values below it are set to zero, so the causal relation is ignored. This study uses 0.1030.103 as the threshold. All matrix T values below 0.1030.103 are set to zero, so the causal relation is ignored.

### 3.6.6 Final output and create a causal relation diagram

The next step is to find out the sum of each row and each column of T (in step 4). The sum of rows (D) and columns (R) can be calculated as follows:

$$D = \sum_{j=1}^{n} T_{ij} \quad (12)$$

$$R = \sum_{i=1}^{n} T_{ij}$$

D and R can be used to calculate D+R and D-R, where D+R represents the factor's importance in the system, and D-R represents its net effects.

## 4. Results

### 4.1 Analysis of Demographic

The data provides a concise overview of the demographic composition of 30 individuals within an organisation. The gender distribution reveals a substantial male majority, comprising 66% of the sample, with females accounting for 33%. Regarding work experience in the Human Resources field, there is a significant preference for employees with less tenure, as 70% have less than five years of experience. This could indicate a relatively nascent or recently formed HR department or a high employee turnover rate. Most respondents have bachelor's degrees as their educational background, with master's degrees being the next most common, and a small percentage holding PhDs. The prevalence of bachelor's degrees in hospitals may be due to the requirement for entry-level positions. In contrast, the presence of advanced degrees may suggest the existence of specialised roles or dedication to higher education within the HR department. This profile generally indicates a workforce with a solid educational background but limited practical experience in the industry, primarily male employees.

**Table 3:** Demographic Profile of Human Resource Department Respondent

| Variables | Values | Frequency | Percentage |
|---|---|---|---|
| Working Experience | 0 - 2 years | 11 | 36.67% |
| | 3 - 5 years | 10 | 33.33% |
| | 6 - 10 years | 6 | 20.00% |
| | > 10 years | 3 | 10.00% |
| Educational Background | Bachelors | 17 | 56.67% |
| | Masters | 10 | 33.33% |
| | PhD | 3 | 10.00% |
| Gender | Male | 20 | 66.67% |
| | Female | 10 | 33.33% |

## 4.2 Fuzzy Delphi Method Analysis

### 4.2.1 Analytical Overview of Aspects:

In assessing sustainable human resource practices, the fuzzy Delphi method yielded definitive scores for each strategic aspect. Green Performance Management and Compensation (A3) was distinguished with the premier score of 0.784549, signifying its paramount importance within the sustainability framework. Following closely were Green Recruitment and Selective Hiring (A1) and Green Development and Training (A2), with scores of 0.775746 and 0.769282, respectively. Although essential, the Green Human Resource Culture and Eco-Friendly Behaviour (A4) and Empowerment of Employees (A4) aspects manifested lower consensus scores of 0.514664 and 0.572927, delineating a relatively moderated agreement amongst the participating experts.

**Table 4:** Aspects of FDPM values

| Aspect | Aspect Name | Score |
|---|---|---|
| A1 | Green Recruitment and Selective Hiring (GRSH) | 0.775746 |
| A2 | Green Development and Training (GDT) | 0.769282 |
| A3 | Green Performance Management and Compensation (GPMC) | 0.784549 |
| A4 | Green Human Resource Culture and Eco-Friendly Behaviors (GHCB) | 0.514664 |
| A5 | Empowerment of Employees (EE) | 0.572927 |

### 4.2.2 Analytical Synopsis of Criteria:

Criteria evaluation through the fuzzy Delphi method elucidated the collective expert stance on pivotal elements within GHRM initiatives. The Environmental Code Enforcement (C18) criterion was the most critically endorsed, scoring 0.818743. This was complemented by the Integration of Sustainability in Professional Development (C11) criterion, which achieved a score of 0.812399, emphasising the integral role of sustainability in organisational growth. Developing Metrics (C15), Communication Strategies (C19), and Green Competence Building Practices (C12), with scores of 0.787495, 0.776800, and 0.777764 respectively, rounded out the top echelon of prioritised criteria. Conversely, the lower spectrum included Alignment with Environmental Goals (C25), (0.510272) and Screening for Environmental Values (C4), (0.532320), indicating these areas may warrant amplified focus to enhance consensus and efficacy in future sustainability strategies.

**Table 5:** Criteria FDPM values

| Criteria | Criteria Name | Defuzzification | Criteria | Criteria Name | Defuzzification |
|---|---|---|---|---|---|
| C1 | Job Descriptions | 0.592604 | C18 | Environmental Code Enforcement | 0.818743 |
| C2 | Attracting Candidates | 0.525533 | C19 | Communication Strategies | 0.776800 |
| C3 | Employment Position Description | 0.574493 | C20 | Awareness and Education | 0.678224 |
| C4 | Screening for Environmental Values | 0.532320 | C21 | Promotion of Green Values | 0.719077 |
| C5 | Green interviews | 0.588952 | C22 | Culture Promotion | 0.769713 |
| C6 | Green Branding in Recruitment | 0.703419 | C23 | Pro-Environmentalist Attitude | 0.748320 |
| C7 | Employee Skills and Training | 0.743780 | C24 | Employee Motivation | 0.573295 |
| C8 | Employee Involvement and Participation | 0.744422 | C25 | Alignment with Environmental Goals | 0.510272 |
| C9 | Outcomes of Environment Management Systems | 0.725141 | C26 | Decision-Making Authority | 0.600945 |
| C10 | Continuous Learning and Development | 0.732037 | C27 | Feedback and Recognition | 0.585677 |
| C11 | Integration of Sustainability in Professional Development | 0.812399 | C28 | Freedom of Expression | 0.567515 |
| C12 | Green Competence-Building Practices | 0.777764 | C29 | Empowerment through Technology | 0.801731 |

| | | | | | |
|---|---|---|---|---|---|
| C13 | Environmental Performance Enhancement | 0.773096 | C30 | Influence on Policy Development | 0.780438 |
| C14 | Adoption of Green Standards | 0.720537 | C31 | Cross-departmental Collaboration for Sustainability | 0.600697 |
| C15 | Developing Metrics | 0.787495 | C32 | Creativity and Innovation | 0.709740 |
| C16 | Systematic Evaluation Process | 0.719608 | C33 | Ability to Identify and Address Issues | 0.626602 |
| C17 | Transparent Evaluation | 0.745535 | | | |

## 4.3Fuzzy DEMATEL Analysis

### 4.3.2 Aspect Analysis Fuzzy DEMATEL

The interrelationships and influence dynamics of sustainable HRM in Indian healthcare have been structured by Fuzzy DEMATEL analysis. Table 6 and Figure 1 show that Green Development and Training (A2) and Green Performance Management and Compensation (A3) had the highest D+R values of 4.167 and 4.083, respectively. This prominence indicates their critical role as system drivers; changes or improvements in these areas will likely affect the entire network of sustainable HRM practices. Both aspects are causal, with positive D-R values of 0.704 and 0.734, suggesting they influence and contribute to other aspects of the sustainable HRM framework.

While important, Green Recruitment and Green Hiring (A1) has a D+R value of 3.584 and a D-R value of -0.221, making it a system effect. Effect aspects Green HR Culture and Eco-Friendly Behaviour (A4) and Empowerment of Employees (A5) have negative D-R values of -0.6 and -0.617, respectively. These findings suggest that these aspects are receptive and influenced by other system variables rather than influencing them. The Cause-Effect Diagram (Figure 1) shows this hierarchy of aspects along the D-R axis, illustrating their roles in the sustainable HRM ecosystem. Table 6's numerical data and the Cause-Effect Diagram's positions provide a more detailed analysis of each aspect's role.

**Table 6:** The final output for Aspect

| Aspect | R | D | D+R | D-R |
|---|---|---|---|---|
| Aspect1 | 1.902 | 1.681 | 3.584 | -0.221 |
| Aspect2 | 1.731 | 2.436 | 4.167 | 0.704 |
| Aspect3 | 1.674 | 2.408 | 4.083 | 0.734 |
| Aspect4 | 2.034 | 1.434 | 3.467 | -0.6 |
| Aspect5 | 2.043 | 1.426 | 3.469 | -0.617 |

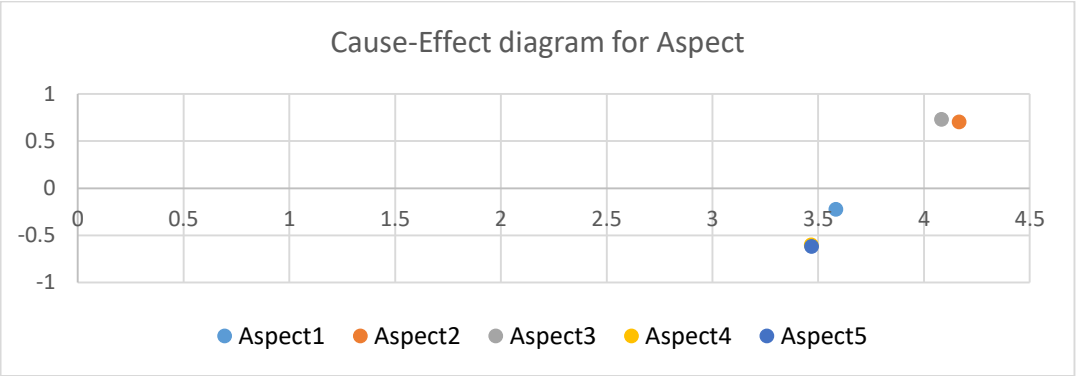


**Figure 1:** Cause-effect Diagram for Aspect

### 4.3.2 Criteria Analysis Fuzzy DEMATEL

The DEMATEL analysis in Table 7 shows the complex influence hierarchy of sustainable human resource management criteria in Gujarat, India's healthcare sector. Figure 2 shows that Environmental Performance Enhancement (C13) controls the system's dynamics with the highest D+R value of 7.279. This criterion and the Transparent Evaluation (C17) drive the sustainability agenda in healthcare HRM practices. Their positive D-R values make them causal variables, suggesting that these initiatives could cause systemic change.

Fundamental criteria like Job Descriptions (C1) and Green Branding in Recruitment (C6) are effect factors. Their lower D+R values indicate less impact on system sustainability. These criteria are influenced by more dominant factors rather than being the driving force. For intervention strategy, this distinction suggests that improving recruitment and branding, while important, may require stronger, more influential sustainability practices to be truly effective. Figure 2's Cause-Effect Diagram supports these interpretations by mapping each criterion's impact and role in the GHRM framework and providing a strategic visualisation for policy development.

**Table 7:** Final Output for Criteria

| Criteria | R | D | D+R | D-R |
|---|---|---|---|---|
| criterion1 | 3.411 | 3.043 | 6.455 | -0.368 |
| criterion2 | 3.464 | 3.143 | 6.607 | -0.321 |
| criterion3 | 3.367 | 3.08 | 6.447 | -0.288 |
| criterion4 | 3.37 | 3.09 | 6.461 | -0.28 |
| criterion5 | 3.424 | 3.16 | 6.584 | -0.264 |
| criterion6 | 3.477 | 3.087 | 6.565 | -0.39 |
| criterion7 | 3.368 | 3.143 | 6.511 | -0.225 |
| criterion8 | 3.401 | 3.056 | 6.457 | -0.345 |
| criterion9 | 3.429 | 3.125 | 6.553 | -0.304 |
| criterion10 | 3.352 | 3.044 | 6.396 | -0.309 |
| criterion11 | 3.469 | 3.065 | 6.534 | -0.404 |
| criterion12 | 3.469 | 3.111 | 6.581 | -0.358 |
| criterion13 | 3.426 | 3.853 | 7.279 | 0.427 |
| criterion14 | 3.391 | 3.81 | 7.201 | 0.419 |
| criterion15 | 3.393 | 3.817 | 7.21 | 0.425 |
| criterion16 | 3.335 | 3.764 | 7.098 | 0.429 |
| criterion17 | 3.351 | 3.814 | 7.165 | 0.463 |
| criterion18 | 3.364 | 3.813 | 7.177 | 0.449 |
| criterion19 | 3.388 | 3.789 | 7.177 | 0.401 |
| criterion20 | 3.408 | 2.953 | 6.361 | -0.455 |
| criterion21 | 3.366 | 2.985 | 6.35 | -0.381 |
| criterion22 | 3.347 | 2.986 | 6.333 | -0.361 |
| criterion23 | 3.429 | 2.99 | 6.42 | -0.439 |
| criterion24 | 3.315 | 2.925 | 6.24 | -0.39 |
| criterion25 | 3.463 | 2.991 | 6.454 | -0.472 |
| criterion26 | 3.369 | 3.783 | 7.152 | 0.414 |
| criterion27 | 3.389 | 3.807 | 7.196 | 0.417 |
| criterion28 | 3.371 | 3.762 | 7.132 | 0.391 |
| criterion29 | 3.374 | 3.796 | 7.17 | 0.422 |
| criterion30 | 3.406 | 3.813 | 7.219 | 0.407 |
| criterion31 | 3.386 | 3.834 | 7.22 | 0.447 |
| criterion32 | 3.41 | 3.801 | 7.211 | 0.391 |
| criterion33 | 3.375 | 3.828 | 7.203 | 0.452 |

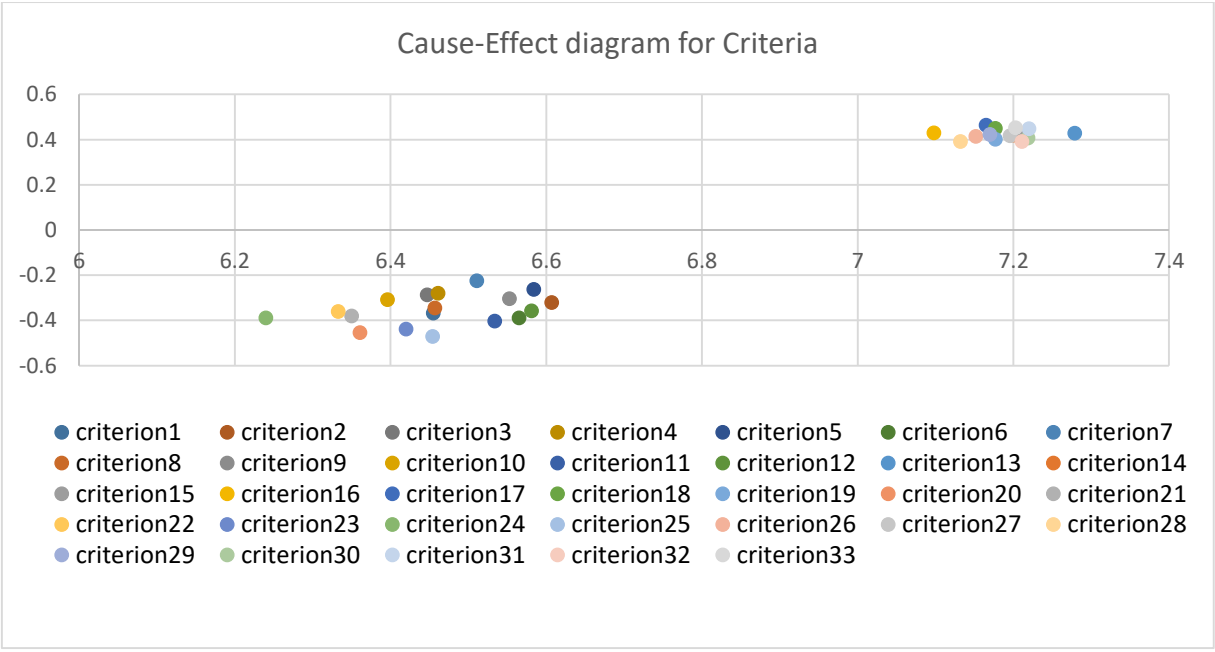


**Figure 2:** Cause-effect Diagram for Criteria

## 5. Discussion

The Fuzzy Delphi method and Fuzzy DEMATEL findings emphasise performance management and training in sustainable HRM. These findings suggest HR professionals agree on Green Performance Management and Compensation (A3) and Green Development and Training (A2). A3 is crucial because it shapes healthcare organisations' ethics and public perception. Its 0.784549 score shows a strong focus on performance-driven

sustainability. A2, with 0.769282, emphasises the importance of ongoing skill development in environmental stewardship and contributing to the global corporate citizenship movement. It boosts employee retention and engagement.

However, Green Hiring (A1) and Employee Empowerment (A5) demonstrate the complex relationship between organisational influences and sustainability initiatives. The impact score of A1 in promoting a sustainability mindset depends on the strength of sustainable practices in organisations. Given the moderate score of A5, sustainability may be implemented differently in different hospital settings due to independence and organisational culture. These findings illuminate the complex challenges of successfully integrating sustainability into HR practises. They stress the need for a holistic approach beyond regulatory compliance and effective communication. HR duties must also be aligned with sustainability goals.

## 6. Conclusion

The study aimed to investigate and assess sustainable human resource management in the Indian healthcare sector by combining the Fuzzy Delphi Method (FDPM) and Decision-Making Trial and Fuzzy Evaluation Laboratory (DEMATEL) approaches. The results highlight the strategic significance of Green Performance Management and Compensation (A3) and Green Development and Training (A2) in promoting sustainability. HR professionals prioritised these aspects, aligning with the overall trend of emphasising performance-driven sustainability and cultivating a skilled workforce capable of environmental stewardship. On the other hand, aspects like Green Recruitment and Selective Hiring (A1) and Empowerment of Employees (A5), although crucial, were perceived as manifestations of the broader organisational culture and values. The importance of Environmental Code Enforcement (C18) criteria has become evident, highlighting the necessity for strong policy frameworks to direct sustainable HRM practices.

### 6.1 Practical Implications for Managers

The research helps healthcare managers prioritise HR interventions for sustainability. Training and performance management that support sustainability goals can help organisations transform more deeply. Managers must also realise that recruitment and empowerment have little impact on sustainability efforts. These areas are important, but they may need help to influence sustainability efforts on a larger scale.

### 6.2 Theoretical implications

The study enhances the existing literature on GHRM by providing empirical evidence that validates the hierarchical influence of different HR aspects and criteria. This validation is achieved using the FDPM (Fuzzy Delphi Method) and Fuzzy DEMATEL (Fuzzy Decision-Making Trial and Evaluation Laboratory) methods. This theory expands the scope of the AMO theory in the context of sustainability, providing a detailed comprehension of how ability, motivation, and opportunity can be utilised to improve sustainability in the healthcare industry.

### 6.3 Limitations of This Study

The research acknowledges limitations, such as the small sample size and its focus on specific regions in India, which could impact the generalizability of the findings. Furthermore, it is important to consider the dependence on self-reported measures and the possibility of bias in expert responses.

### 6.3 Potential Future Directions for This Research

Future research could broaden the geographical scope to encompass various regions within all Indian territories or compare findings with those of other emerging economies. Longitudinal studies can also offer valuable insights into the development of GHRM practices and their lasting effects on organisational sustainability. Furthermore, researching the impact of digitalisation on improving GHRM practices could provide valuable knowledge for healthcare organisations shifting towards more sustainable operations.

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