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Identification and Prioritization of the Components of a Systematic Model for Human Resource Development in Non-Governmental Organizations

ABSTRACT

Non-governmental organizations (NGOs), as one of the principal pillars of social development, play a significant role in responding to the diverse and complex needs of societies, and the achievement of their missions largely depends on the quality and sustainability of human resources. However, the absence of a systematic and prioritized framework for human resource development has created challenges for the effectiveness of organizational performance in these institutions. The present study was conducted with the aim of identifying and prioritizing the components of a human resource development model in non-governmental organizations. In terms of purpose, the research is applied, and methodologically it follows a mixed qualitative–quantitative design. In the qualitative phase, thematic analysis and semi-structured interviews with experts were employed. In the quantitative phase, fuzzy DEMATEL and Analytic Network Process (ANP) methods were applied to analyze causal relationships and determine component weights. The statistical population consisted of 20 university scholars and experts in the field of non-governmental organizations, who were selected through purposive sampling. The findings indicated that the three main dimensions of human resource development included organizational dimensions with a weight of 0.5260, environmental dimensions with a weight of 0.2657, and individual dimensions with a weight of 0.2083. Among the identified components, the promotion system ranked first with a weight of 0.1502, followed by the macro-environment with a weight of 0.1392 and individual motivations with a weight of 0.1278, whereas the training and development system and the recruitment system received the lowest weights. Overall, the proposed model can serve as a decision-support framework for managers in optimizing resource allocation and enhancing the sustainability of human capital.

Keywords: Human Resource Development; Non-Governmental Organizations; Individual Dimensions; Organizational Dimensions; Environmental Dimensions.

Introduction

Non-governmental organizations (NGOs) have emerged as one of the most influential institutional actors in contemporary societies, playing a critical role in addressing complex social, economic, environmental, and humanitarian challenges that governments and markets alone are often unable to resolve. Across developing and developed contexts alike, NGOs contribute significantly to public service delivery, social innovation, community empowerment, and participatory governance, particularly in sectors such as education, health, environmental protection, and social welfare [1]. The expansion of NGO activities has transformed these organizations from small volunteer-based entities into professionalized institutions that require structured managerial systems, strategic planning capabilities, and sustainable human resource practices to maintain

effectiveness and legitimacy [2, 3]. Consequently, the success of NGOs increasingly depends on their capacity to develop, retain, and strategically manage human capital.

Human resource development (HRD) has gradually shifted from a traditional training-oriented perspective toward a strategic and systemic approach emphasizing organizational learning, competency development, leadership cultivation, and sustainable workforce capability. Contemporary HRD theory highlights that organizations achieve long-term effectiveness not merely through financial or technological resources but through continuous investment in human capabilities and institutional knowledge creation [4]. In NGOs, this issue becomes even more critical because human resources often constitute the primary organizational asset, compensating for limited financial stability and structural constraints [5]. Unlike profit-oriented enterprises, NGOs frequently rely on a hybrid workforce composed of volunteers, part-time staff, activists, and professionals whose motivations are shaped by social values and mission commitment rather than purely economic incentives.

The distinctive nature of NGO work environments creates unique challenges for human resource development. Many NGOs operate under uncertain funding conditions, fluctuating project cycles, and evolving stakeholder expectations, which complicate long-term workforce planning and professional development initiatives. Research demonstrates that the absence of systematic HRD frameworks can weaken organizational sustainability, reduce employee commitment, and hinder institutional learning processes [6]. Moreover, NGOs often face tensions between value-driven participation and professional competency requirements, creating gaps between organizational mission orientation and managerial efficiency [7]. These challenges highlight the necessity of designing structured and context-sensitive HRD models tailored specifically to nonprofit organizational environments.

Strategic human resource management literature increasingly emphasizes that HRD must be integrated with organizational strategy and governance systems rather than treated as an isolated administrative function. Strategic maturity in HR systems enables organizations to align workforce capabilities with long-term institutional goals, promote innovation, and enhance organizational resilience [8]. In NGOs, where collaborative governance and cross-sector partnerships are common, effective HRD systems facilitate cooperation among governmental bodies, communities, and civil society actors [9, 10]. Studies of NGO–government cooperation indicate that organizational effectiveness depends heavily on professional competencies, leadership development, and adaptive learning mechanisms within nonprofit workforces [11].

Another critical dimension influencing HRD in NGOs relates to organizational culture and social values. Cultural norms, ethical commitments, and collective identity significantly shape employee motivation, innovation capacity, and organizational cohesion. Culture-driven HRD approaches emphasize empowerment, shared learning, and participatory leadership models that reinforce mission alignment and institutional trust [12, 13]. In mission-oriented organizations, employees' intrinsic motivations—such as social responsibility, altruism, and community commitment—function as powerful drivers of performance, yet these motivations require supportive organizational systems to prevent burnout and attrition [14].

Educational and developmental systems constitute another central pillar of HRD. Training initiatives, competency-building programs, and professional standards help employees adapt to rapidly changing technological and organizational environments. Research emphasizes that structured education and continuous learning significantly enhance strategic human resource outcomes and organizational effectiveness [15]. Professional standards and skill frameworks are particularly essential in the context of Industry 4.0 and digital transformation, where organizations must continuously upgrade workforce

competencies to remain relevant [16]. For NGOs, which increasingly operate in digitally mediated environments, integrating technology-driven HR practices has become an emerging necessity.

The digital transformation of human resource management has introduced new opportunities for NGOs to strengthen workforce development through data-driven decision-making, artificial intelligence applications, and digital collaboration platforms. Recent studies show that AI-based HR systems can enhance talent acquisition, performance monitoring, and organizational learning while improving strategic alignment between human resources and organizational missions [17, 18]. Furthermore, technology-supported HRD contributes to organizational agility and resilience by enabling adaptive responses to environmental uncertainty and crisis situations [19]. Nevertheless, digital adoption in NGOs remains uneven, often constrained by limited resources and insufficient managerial expertise.

Leadership development and innovation capability also play decisive roles in HRD effectiveness. Shared leadership practices, participatory decision-making, and collaborative learning environments foster innovation and organizational performance, especially in knowledge-intensive and socially oriented institutions [20]. Transformational HRD interventions have been shown to enhance employee engagement, organizational adaptability, and performance outcomes by strengthening learning cultures and leadership competencies [21]. In NGOs, leadership is frequently distributed across networks rather than centralized hierarchies, making structured HRD systems essential for sustaining institutional continuity.

Sustainability considerations further expand the scope of HRD beyond organizational boundaries. Sustainable HRM perspectives emphasize balancing organizational performance with employee well-being, social responsibility, and environmental accountability. Human resource development therefore becomes a mechanism for achieving sustainable organizational growth and societal impact simultaneously [22]. NGOs, whose missions inherently address social sustainability, require HRD models that integrate ethical values, community engagement, and long-term human capital development.

Entrepreneurial and innovation-oriented approaches to HRD also contribute to organizational sustainability. Studies examining innovative institutional ecosystems highlight the importance of developing entrepreneurial competencies, knowledge-sharing networks, and innovation platforms within organizations to foster adaptability and long-term growth [23]. Similarly, cognitive and competency-based employee development models have been shown to enhance creativity, learning capability, and organizational effectiveness across cultural and creative industries [24]. These findings suggest that HRD in NGOs must transcend conventional administrative practices and adopt systemic, multidimensional frameworks encompassing organizational structures, individual competencies, and environmental influences.

Recent scholarship has increasingly recognized that human resource development operates at multiple analytical levels, including national, organizational, and individual dimensions. Meta-analytical studies emphasize that effective HRD systems emerge from the interaction between institutional policies, organizational culture, leadership practices, and employee characteristics [4]. In the nonprofit context, social participation, stakeholder collaboration, and community trust further shape HRD outcomes, reinforcing the need for integrative and systematic models capable of capturing these interdependencies [2].

Despite growing academic attention to HRD, significant research gaps remain regarding systematic and prioritized frameworks tailored to NGOs. Much of the existing literature focuses either on governmental organizations or private enterprises, leaving nonprofit institutions without context-specific models that account for their unique governance structures, resource constraints, and mission-driven orientations [7]. Moreover, the interaction between organizational,

individual, and environmental dimensions of HRD has rarely been examined through integrated analytical approaches capable of identifying causal relationships among factors.

Given the increasing complexity of NGO environments, the development of a systematic model that identifies, categorizes, and prioritizes HRD components becomes essential for enhancing organizational effectiveness and sustainability. Such a model can support managers and policymakers in allocating resources efficiently, strengthening human capital resilience, and improving organizational performance within civil society institutions. Therefore, this study aims to identify and prioritize the components of a systematic model for human resource development in non-governmental organizations.

Methodology

This study is applied in terms of objective and descriptive in terms of data collection, and it follows a causal research approach. The statistical population in the qualitative phase consisted of experts and specialists working in non-governmental organizations (NGOs). The research participants included 20 experts who possessed the highest level of experience related to the research topic. In addition, these participants had professional experience in NGOs, had held managerial positions, and possessed at least a master's degree. The criteria for selecting experts included theoretical mastery, practical experience, willingness and ability to participate in the research, and accessibility. In this phase, semi-structured interviews were conducted with 20 experts and specialists to identify and prioritize the components of a systematic model for human resource development in NGOs. The results of demographic analysis are presented in Table 1.

Table 1

Frequency Distribution of the Statistical Sample Based on Experts' Demographic Characteristics

Variable	Variable Levels	Frequency	Percentage
Gender	Male	13	65
	Female	7	35
	Total	20	100
Work Experience	Less than 10 years	2	10
	11–15 years	2	10
	16–20 years	2	10
	21–25 years	5	25
	26–30 years	7	35
	More than 30 years	2	10
	Total	20	100
Age	31–40 years	2	10
	41–50 years	11	55
	51 years and above	7	35
	Total	20	100
Marital Status	Single	1	5
	Married	19	95
	Total	20	100
Education	Master's degree and above	20	100
	Total	20	100

In this research, a total of 20 interviews were conducted. The following coding tables included excerpts from interview statements, main themes, and related subthemes. Thematic analysis was employed as an iterative and recursive process involving continuous movement between analytical stages. The stages applied in this study are described below.

Stage 1: Familiarization with the Data

To achieve a deep understanding of the breadth and depth of the data content, the researcher immersed themselves in the data. Data immersion typically involves repeated reading and active engagement with the data, meaning continuous

searching for meanings and patterns. At this stage, the researcher repeatedly reviewed interview transcripts and moved iteratively between interview materials to obtain an accurate understanding of thematic content and to ensure maximum alignment across extracted concepts.

Stage 2: Generating Initial Codes (Subthemes)

The second stage began after the researcher became familiar with the data. This phase involved generating subthemes derived from the dataset. Subthemes represent meaningful characteristics within the data that are considered analytically significant. These subthemes differ from thematic analytical units and essentially represent embedded meanings or concepts within sentences or paragraphs. Through careful examination of interview texts and continuous efforts to address research questions, the researcher identified these meanings. In this study, coding was conducted manually. Initially, interview texts were summarized, followed by annotation and color-coding procedures to identify subthemes. Subsequently, these subthemes were matched with summarized data reflecting each concept. The researcher conducted sentence-by-sentence and paragraph-by-paragraph analysis of transcribed interviews and assigned corresponding subthemes to each meaningful segment.

Stage 3: Searching for Themes

This stage involved organizing various subthemes into broader subthemes and systematically arranging summarized coded data accordingly. The researcher began analyzing relationships among codes and examined how different subthemes could be combined to form overarching themes. Similar subthemes were grouped together to construct secondary themes. A critical requirement at this stage was ensuring coherence between subthemes, secondary themes, and theoretical foundations. Through iterative movement between interview data and theoretical considerations, conceptual consistency was achieved.

Stage 4: Reviewing Themes

The fourth stage began once a preliminary set of themes had been developed. This phase consisted of reviewing and refining themes at two levels. First, themes were evaluated at the level of coded data extracts. Second, their validity was assessed in relation to the entire dataset. If the thematic map demonstrated adequate explanatory power, the process proceeded to the next stage. Otherwise, the researcher revisited earlier coding steps until a satisfactory thematic structure was achieved. At the conclusion of this stage, the researcher gained a comprehensive understanding of existing themes, their interrelationships, and the overall narrative emerging from the data.

After completing the analysis of interview texts, the researcher reexamined all subthemes and secondary themes to ensure conceptual coherence and logical continuity. Particular attention was paid to ensuring that all identified themes directly addressed the research questions, which was confirmed.

Stage 5: Defining and Naming Themes

This stage began after achieving a satisfactory thematic framework. The researcher defined, reviewed, and refined the themes presented in the analysis and further examined the data within each theme. Through defining and refining processes, the essential nature of each theme and its representation of specific aspects of the data became clear. At this stage, secondary themes were categorized into main themes to clarify relationships among different thematic dimensions. Continuous iterative review between themes and research objectives enabled the researcher to approach the final research model design.

Stage 6: Report Preparation

The sixth stage commenced once a fully developed thematic structure had been established. This stage involved final analysis and report writing. Following thematic development and classification of subthemes into secondary and main themes, the researcher addressed the research questions based on the analytical framework obtained.

In this study, the components of the systematic model for human resource development in NGOs were first extracted through a comprehensive review of the literature and expert interviews. Subsequently, based on the identified factors, a closed-ended questionnaire containing these factors was distributed among experts. Participants were asked to evaluate, considering a defined time horizon, the degree of influence of each factor listed in rows on the factors listed in columns using a five-point Likert scale ranging from "no influence" to "very high influence."

Content Validity

Content validity refers to the extent to which a measurement instrument adequately reflects the intended content domain. According to Lawshe's method, content validity was established after reviewing the literature and defining questionnaire content dimensions. Members of the expert panel were asked to evaluate each item by selecting one of three options: "essential," "useful but not essential," or "not necessary." The Content Validity Ratio (CVR) was calculated using the following formula. Considering the statistical significance level ($p < .05$), a minimum CVR value of 0.75 was required for item acceptance.

N_e = number of panel members selecting the option "essential"

N = total number of panel members

After completing the content validity assessment, the CVR obtained for all factors was equal to 1. This indicates that all experts considered the identified factors essential for determining the components of the systematic model for human resource development in NGOs.

Reliability

To assess questionnaire reliability, the test–retest method was employed for the DEMATEL questionnaire. For this purpose, the questionnaire was administered twice to five experts who were accessible for follow-up, with a three-week interval between administrations. The correlations between responses in the first and second stages were 0.778, 0.809, and 0.911. Since all correlation coefficients exceeded the acceptable threshold of 0.70, the questionnaire reliability was considered satisfactory.

Findings and Results

The research question addressed in this study was formulated as follows: *What are the main and subthemes related to identifying the components of a systematic model for human resource development in non-governmental organizations (NGOs)?* A total of 20 interviews were conducted in this study, and the analysis of participants' responses is presented in Table 2.

Table 2

Selected Interview Excerpts and Extraction of Subthemes

Excerpts from Interview Texts	Subthemes
"In most non-governmental organizations, recruitment processes are largely based on personal acquaintance, volunteering, or individual motivations rather than professional competencies. Although value-driven motivations are highly important, the absence of clear competency criteria has resulted in some personnel lacking alignment with the organization's specialized missions, which negatively affects long-term human resource productivity."	Recruitment and Deployment System
"Training in NGOs is often conducted intermittently and non-systematically and relies mainly on informal experience transfer. In many cases, training programs are not aligned with employees' actual job needs or their professional development paths, limiting the effectiveness of training in improving staff performance."	Training System
"Human resource development in NGOs is often interpreted as socializing individuals into the organization's value-based environment, while skill development, leadership capacity, and decision-making competencies receive less attention. The absence of a coherent program for developing future NGO managers and leaders appears to be a major challenge in human resource development."	Education and Development System
"Performance evaluation in many NGOs is either conducted formally without real effectiveness or does not exist at all. Due to the voluntary nature of activities, managers often avoid formal evaluations; however, the absence of transparent feedback reduces motivation, creates role ambiguity, and weakens organizational learning."	Performance Evaluation System
"Career advancement paths in NGOs are often unclear and unpredictable. Promotions are typically based on attendance, tenure, or informal relationships rather than competence, performance, and learning achievements. This situation may create perceptions of injustice among capable personnel and reduce their retention motivation."	Promotion System
"Due to financial limitations, many NGOs lack structured compensation systems, particularly regarding job security and retirement planning. Consequently, skilled professionals rarely consider NGOs as long-term career paths and instead prefer short-term collaboration."	Compensation and Retirement System
"Organizational structures in NGOs are generally flexible and informal, which on one hand enhances creativity and participation, but on the other hand, the absence of clearly defined structures and processes may lead to role ambiguity and underutilization of human resource capacities."	Organizational Characteristics
"A significant proportion of NGO personnel enter this field driven by intrinsic, value-based, and social motivations. However, if these motivations are not reinforced through supportive systems, learning opportunities, and recognition mechanisms, motivational erosion and organizational withdrawal gradually occur."	Individual Motivations
"Personal characteristics such as social commitment, resilience, teamwork orientation, and adaptability play an essential role in individuals' success within NGOs. Nevertheless, the lack of mechanisms for identifying and developing these attributes prevents full realization of individual potential."	Personal Characteristics
"Interactions among members, leadership styles, and the quality of internal organizational relationships have a direct impact on human resource development in NGOs. Organizations characterized by trust-based communication, participation, and mutual learning demonstrate significantly higher employee retention and growth."	Proximal Environment
"The legal environment, governmental support policies, and societal and institutional attitudes toward NGOs play a decisive role in human resource development. The absence of stable support mechanisms and legal ambiguities creates significant challenges for long-term human capital development planning."	Distal Environment

The main and subthemes related to the components of the systematic model for human resource development in non-governmental organizations (NGOs) are presented in Table 3.

Table 3

Main and Subthemes of Factors Influencing the Systematic Model for Human Resource Development in Non-Governmental Organizations

Main Themes	Subthemes
Organizational Dimensions (OD)	Recruitment and Deployment System
	Training System
	Education and Development System
	Performance Evaluation System
	Promotion System
	Compensation and Retirement System
	Organizational Characteristics
Individual Dimensions (ID)	Individual Motivations
	Personal Characteristics
Environmental Dimensions (ED)	Proximal Environment
	Distal Environment

This study aimed to assign weights to the categories of human resource development in non-governmental organizations. After identifying the categories, an appropriate questionnaire was developed and distributed among experts. Responses regarding the influence of each factor on other factors were collected.

In the first stage of the research, eleven components and three dimensions were identified based on the opinions of twenty experts. Table 4 presents these factors.

Table 4

Dimensions and Components of Human Resource Development in Non-Governmental Organizations

Dimensions	Components	Code
Organizational Dimensions (OD)	Recruitment and Deployment System	OD1
	Training System	OD2
	Education and Development System	OD3
	Performance Evaluation System	OD4
	Promotion System	OD5
	Compensation and Retirement System	OD6
	Organizational Characteristics	OD7
Individual Dimensions (ID)	Individual Motivations	ID1
	Personal Characteristics	ID2
Environmental Dimensions (ED)	Proximal Environment	ED1
	Distal Environment	ED2

In the second phase, the opinions of twenty experts were used to compare and determine the relative importance of the eleven components. Experts were asked to express their judgments regarding the superiority of each component over others using linguistic variables, as shown in Table 5. The advantage of this approach over expressing opinions using single numerical values is that experts can express their judgments within numerical ranges, thereby incorporating existing uncertainty. For this reason, fuzzy logic concepts were employed in this research.

Finally, the fuzzy DEMATEL technique was applied to classify these factors.

The DEMATEL technique, originally developed by American scientists between 1926 and 1972, is a method designed for analyzing complex problems. This technique is based on graph theory and enables the simplification of complex issues through structured analytical procedures. The fuzzy DEMATEL method facilitates decision-making under environmental uncertainty by employing fuzzy linguistic variables. This technique enables organizations to address complex problems through group decision-making under fuzzy conditions (Quan, 2011). Furthermore, it allows organizational problems to be analyzed using collective expert judgment in uncertain environments. The procedural steps of this technique are described as follows (Reyes, 2011).

Step 1: Designing Fuzzy Linguistic Criteria

At this stage, appropriate criteria for decision-making must be determined. To reduce uncertainty, linguistic evaluation scales are provided to decision-makers so that criteria can be compared based on standardized linguistic expressions.

Table 5

Linguistic Variables Used for Expert Judgments

Linguistic Terms	No Influence	Very Low	Low	Moderately High	High	Very High
Fuzzy Values	(0,0,0)	(1,1,1)	(4,3,2)	(6,5,4)	(8,7,6)	(9,9,8)

Step 2: Constructing the Expert Survey Matrix

In this step, each respondent was asked to determine the influence of one criterion on another based on Table 5. The notation $\tilde{o}_{ij} = (l_{ij}, m_{ij}, u_{ij})$ represents the respondent's judgment regarding the effect of factor *i* on factor *j*. For all cases where *i = j*, the value zero was assigned in the matrices. For each respondent, an $n \times n$ fuzzy matrix was defined as $\tilde{O}^p = [\tilde{o}_{ij}^p]$, where *p* represents the number of respondents and *n* represents the number of studied factors. Therefore, matrices $\tilde{O}^{(1)}, \tilde{O}^{(2)}, \tilde{O}^{(3)}, \dots, \tilde{O}^{(p)}$ were obtained from all respondents.

Step 3: Constructing the Initial Decision Matrix ($\tilde{O}$)

The initial decision matrix was derived from the arithmetic mean of all expert judgments, where (l_{ij}, m_{ij}, u_{ij}) represent triangular fuzzy numbers.

$$\tilde{O}_{ij} = \frac{1}{P}\sum_{p=1}^{P}\tilde{a}_{ij}^{p}$$

$$\tilde{O} = \begin{bmatrix} \tilde{O}_{11} & \tilde{O}_{12} & \tilde{O}_{13} & \dots & \tilde{O}_{1n} \\ \tilde{O}_{21} & \tilde{O}_{22} & \tilde{O}_{23} & \dots & \tilde{O}_{2n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \tilde{O}_{m1} & \tilde{O}_{m2} & \tilde{O}_{m3} & \dots & \tilde{O}_{mn} \end{bmatrix}$$

Table 6

Average Expert Opinions for Pairwise Comparison of Components

(Triangular fuzzy numbers: l = lower bound, m = mean value, u = upper bound)

M		OD1	OD2	OD3	OD4	OD5	OD6	OD7	ID1	ID2	ED1	ED2
OD1	l	0	4.33	3	3	4.67	4.67	5.33	4	5.33	4	2.33
	m	0	5	3.67	3.67	5.67	5.67	6.33	5	6.33	5	3
	u	0	5.33	4.33	4.33	6.67	6.33	7	6	7.33	6	3.67
OD2	l	1.67	0	4.67	5.67	4	4.33	4.67	2.33	4	4.33	2.33
	m	2.33	0	5.67	6.33	5	5	5.67	3	5	5	3
	u	3	0	6.33	6.33	6	5.33	6.33	3.67	6	5.33	3.67
OD3	l	5	5.67	0	2.33	6.67	4.33	4.33	5	2	7.33	2
	m	5.67	6.33	0	3	7.67	5	5	5.67	2.33	8.33	2.33
	u	6	6.33	0	3.67	8	5.33	5.67	6	2.67	8.67	2.67
OD4	l	5.67	3.67	4	0	3	1.67	2.33	3.33	3	3.67	5
	m	6.33	4.33	5	0	3.67	2.33	3	4.33	3.67	4.33	5.67
	u	6.33	5	6	0	4.33	3	3.67	5.33	4.33	4.67	6
OD5	l	4.67	3.67	3.33	4	0	3	5	6.67	3.33	2.67	1.67
	m	5.67	4.33	3.67	5	0	3.67	5.67	7.67	4.33	3.67	2.33
	u	6.33	5	3.67	6	0	4.33	6	8	5.33	4.67	3
OD6	l	3.67	4.33	5.33	5	6	0	1.67	4	4.67	2.33	4
	m	4.33	5	6.33	5.67	7	0	2.33	5	5.67	3	5
	u	4.67	5.33	7	6	7.33	0	3	6	6.67	3.67	6
OD7	l	1.33	3.67	3.67	3	6	3.67	0	2	8	4.67	4
	m	1.67	4.33	4.33	3.67	7	4.33	0	2.33	9	5.67	5
	u	2	4.67	5	4.33	8	4.67	0	2.67	9	6.33	6
ID1	l	6.67	6	3.33	5.33	3	3	7.33	0	7.33	4.67	5
	m	7.67	7	3.67	6.33	3.67	3.67	8.33	0	8.33	5.67	5.67
	u	8.33	7.67	3.69	7	4.33	4.33	8.67	0	8.67	6.33	6
ID2	l	7.33	5	5.33	3	5.33	6.67	3	3.33	0	2.33	3
	m	8.33	5.67	6.33	3.67	6.33	7.67	3.67	4.33	0	3	3.67
	u	8.67	6	7	4.33	7	8.33	4.33	5.33	0	3.67	4.33
ED1	l	4.67	3.33	3.67	5.33	4	5	5.33	7.33	1.33	0	4.33
	m	5.67	4.33	4.33	6.33	5	5.67	6.33	8.33	1.67	0	5
	u	6.67	5.33	4.67	7	6	6	7	8.67	2	0	5.67
ED2	l	6.67	5	5.33	3.67	4	8	3.33	5	4	4.67	0
	m	7.67	5.67	6.33	4.33	5	9	3.67	5.67	5	5.67	0
	u	8	6	7	4.67	6	9	3.67	6	6	6.67	0

Step 4: Computing the Normalized (Standardized) Matrix ($\tilde{z}$)

In the fourth step, the normalized matrix ($\tilde{z}$) is computed. To obtain the normalized matrix, Equations (2) and (3) are used.

(2) $h = l, m, u\tilde{H}_{ij} = \tilde{z}_{ij}/r = \left(\frac{l'_{ij}}{r}, \frac{m'_{ij}}{r}, \frac{u'_{ij}}{r}\right) = (l''_{ij}, m''_{ij}, u''_{ij})$

(3) $r = \max_{1 \le i \le n}\left(\sum_{j=1}^{n} u_{ij}\right)$

(4) $\tilde{z} = \begin{bmatrix} \tilde{z}_{11} & \tilde{z}_{12} & \cdots & \tilde{z}_{1n} \\ \tilde{z}_{21} & \tilde{z}_{22} & \cdots & \tilde{z}_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ \tilde{z}_{m1} & \tilde{z}_{m2} & \cdots & \tilde{z}_{mn} \end{bmatrix}$

Table 7

Normalized Matrix of Table 6

NORM		OD1	OD2	OD3	OD4	OD5	OD6	OD7	ID1	ID2	ED1	ED2
OD1	l	0.000	0.026	0.018	0.018	0.028	0.028	0.032	0.024	0.032	0.024	0.014
	m	0.000	0.030	0.022	0.022	0.034	0.034	0.038	0.030	0.038	0.030	0.018
	u	0.000	0.032	0.026	0.026	0.040	0.038	0.042	0.036	0.044	0.036	0.022
OD2	l	0.010	0.000	0.028	0.034	0.024	0.026	0.028	0.014	0.024	0.026	0.014
	m	0.014	0.000	0.034	0.038	0.030	0.030	0.034	0.018	0.030	0.030	0.018
	u	0.018	0.000	0.038	0.038	0.036	0.032	0.038	0.022	0.036	0.032	0.022
OD3	l	0.030	0.034	0.000	0.014	0.040	0.026	0.026	0.030	0.012	0.044	0.012
	m	0.034	0.038	0.000	0.018	0.046	0.030	0.030	0.034	0.014	0.050	0.014
	u	0.036	0.038	0.000	0.022	0.048	0.032	0.034	0.036	0.016	0.052	0.016
OD4	l	0.034	0.022	0.024	0.000	0.018	0.010	0.014	0.020	0.018	0.022	0.030
	m	0.038	0.026	0.030	0.000	0.022	0.014	0.018	0.026	0.022	0.026	0.034
	u	0.038	0.030	0.036	0.000	0.026	0.018	0.022	0.032	0.026	0.028	0.036
OD5	l	0.028	0.022	0.020	0.024	0.000	0.018	0.030	0.040	0.020	0.016	0.010
	m	0.034	0.026	0.022	0.030	0.000	0.022	0.034	0.046	0.026	0.022	0.014
	u	0.038	0.030	0.022	0.036	0.000	0.026	0.036	0.048	0.032	0.028	0.018
OD6	l	0.022	0.026	0.032	0.030	0.036	0.000	0.010	0.024	0.028	0.014	0.024
	m	0.026	0.030	0.038	0.034	0.042	0.000	0.014	0.030	0.034	0.018	0.030
	u	0.028	0.032	0.042	0.036	0.044	0.000	0.018	0.036	0.040	0.022	0.036
OD7	l	0.008	0.022	0.022	0.018	0.036	0.022	0.000	0.012	0.048	0.028	0.024
	m	0.010	0.026	0.026	0.022	0.042	0.026	0.000	0.014	0.054	0.034	0.030
	u	0.012	0.028	0.030	0.026	0.048	0.028	0.000	0.016	0.054	0.038	0.036
ID1	l	0.040	0.036	0.020	0.032	0.018	0.018	0.044	0.000	0.044	0.028	0.030
	m	0.046	0.042	0.022	0.038	0.022	0.022	0.050	0.000	0.050	0.034	0.034
	u	0.050	0.046	0.022	0.042	0.026	0.026	0.052	0.000	0.052	0.038	0.036
ID2	l	0.044	0.030	0.032	0.018	0.032	0.040	0.018	0.020	0.000	0.014	0.018
	m	0.050	0.034	0.038	0.022	0.038	0.046	0.022	0.026	0.000	0.018	0.022
	u	0.052	0.036	0.042	0.026	0.042	0.050	0.026	0.032	0.000	0.022	0.026
ED1	l	0.028	0.020	0.022	0.032	0.024	0.030	0.032	0.044	0.008	0.000	0.026
	m	0.034	0.026	0.026	0.038	0.030	0.034	0.038	0.050	0.010	0.000	0.030
	u	0.040	0.032	0.028	0.042	0.036	0.036	0.042	0.052	0.012	0.000	0.034
ED2	l	0.040	0.030	0.032	0.022	0.024	0.048	0.020	0.030	0.024	0.028	0.000
	m	0.046	0.034	0.038	0.026	0.030	0.054	0.022	0.034	0.030	0.034	0.000
	u	0.048	0.036	0.042	0.028	0.036	0.054	0.022	0.036	0.036	0.040	0.000

Step 5: Computing the Total-Relation Matrix ($\tilde{V}$) for Each Fuzzy Bound

In the fifth step, the $\tilde{V}$ matrix is computed for each fuzzy bound $\left(l''_{ij}, m''_{ij}, u''_{ij}\right)$ using Equations (5), (6), and (7).

(5) $L''_{ij} = \tilde{z}_l \times (I - \tilde{z}_l)^{-1}$

(6) $m''_{ij} = \tilde{z}_m \times (I - \tilde{z}_m)^{-1}$

(7) $u''_{ij} = \tilde{z}_u \times (I - \tilde{z}_u)^{-1}$

At the end of this step, the lower, middle, and upper triangular bounds are combined to compute the total fuzzy matrix $\tilde{V}$.

(8) $\tilde{V} = \begin{bmatrix} \tilde{v}_{11} & \tilde{v}_{12} & \cdots & \tilde{v}_{1m} \\ \tilde{v}_{21} & \tilde{v}_{22} & \cdots & \tilde{v}_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ \tilde{v}_{n1} & \tilde{v}_{n2} & \cdots & \tilde{v}_{nm} \end{bmatrix}$

Step 6: Defuzzification of Fuzzy Numbers

In the sixth step, fuzzy numbers are defuzzified. For this purpose, Equation (9) is applied for each i and j.

(9) $v = \frac{l + 4m + u}{6}$

Therefore, we obtain:

$$(10) \quad V = \begin{bmatrix} v_{11} & v_{12} & \cdots & v_{1n} \\ v_{21} & v_{22} & \cdots & v_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ v_{m1} & v_{m2} & \cdots & v_{mn} \end{bmatrix}$$

Table 8

Defuzzified Matrix

D.F	OD1	OD2	OD3	OD4	OD5	OD6	OD7	ID1	ID2	ED1	ED2
OD1	0.0067	0.0206	0.0169	0.0168	0.0235	0.0225	0.0243	0.0209	0.0249	0.0206	0.0140
OD2	0.0132	0.0058	0.0218	0.0232	0.0211	0.0200	0.0217	0.0148	0.0203	0.0199	0.0136
OD3	0.0228	0.0242	0.0060	0.0152	0.0286	0.0205	0.0213	0.0229	0.0135	0.0297	0.0122
OD4	0.0237	0.0183	0.0198	0.0051	0.0168	0.0126	0.0144	0.0183	0.0163	0.0178	0.0206
OD5	0.0225	0.0187	0.0160	0.0202	0.0064	0.0165	0.0222	0.0274	0.0190	0.0165	0.0118
OD6	0.0193	0.0207	0.0241	0.0221	0.0265	0.0063	0.0131	0.0210	0.0227	0.0150	0.0195
OD7	0.0117	0.0184	0.0186	0.0164	0.0270	0.0187	0.0057	0.0132	0.0309	0.0218	0.0194
ID1	0.0298	0.0275	0.0178	0.0251	0.0191	0.0185	0.0308	0.0073	0.0313	0.0234	0.0223
ID2	0.0305	0.0230	0.0245	0.0170	0.0255	0.0286	0.0173	0.0194	0.0068	0.0153	0.0160
ED1	0.0236	0.0195	0.0187	0.0245	0.0218	0.0227	0.0248	0.0301	0.0122	0.0066	0.0202
ED2	0.0293	0.0236	0.0251	0.0193	0.0227	0.0324	0.0176	0.0236	0.0219	0.0235	0.0059

Step 7: Determining the Threshold Value

The seventh step in this technique is calculating the threshold value. A threshold is used to remove low-impact criteria from the model. In the DEMATEL method, a common threshold value is defined for all elements. Then, elements with values greater than the threshold are entered into matrix U, and elements with values lower than the threshold are replaced with zero in matrix U.

$$(11) \quad T_S = \frac{\sum_{i=1}^{n} \sum_{j=1}^{m} V_{ij}}{m \times n} = \frac{\sum_{j=1}^{m} R_j}{m \times n} = \frac{\sum_{i=1}^{n} D_i}{m \times n}$$

$$(12) \quad \begin{cases} U_{ij} = V_{ij} & \text{if } V_{ij} \geq T_S \\ U_{ij} = 0 & \text{otherwise} \end{cases}$$

Step 8: Computing $R_j - D_i$ and $R_j + D_i$

In the eighth step, $R_j - D_i$ and $R_j + D_i$ are computed, where D_i and R_j are obtained from the sum of each row and each column of the total-relation matrix $\tilde{V}$, respectively. For each indicator, R represents the degree to which that indicator influences other indicators, whereas D represents the extent to which that indicator is influenced by other indicators. Ranking indicators based on the value of R reflects the hierarchy of influencing (driving) indicators, and ranking them based on the value of D reflects the hierarchy of influenced (dependent) indicators. After calculating $R_j - D_i$ and $R_j + D_i$, the cause–effect diagram of influence and dependence is plotted, which constitutes the basis for decision-making. Table 9 reports the influence, dependence, interaction (prominence/importance), and net effect for each factor. As shown in the table below, the intensity of each indicator is expressed in terms of both influence and dependence. An indicator with the highest value of $D + R$ has the greatest interaction with other indicators, and an indicator with the highest value of $D - R$ exerts the greatest net influence on other indicators.

Table 9

Computations of D_i and R_j

Factor	(Importance) $D + R$	(Net Effect) $D - R$	(Dependence) D	(Influence) R
OD1	0.4449	-0.0213	0.2118	0.2331
OD2	0.4159	-0.0248	0.1956	0.2204
OD3	0.4262	0.0074	0.2168	0.2094
OD4	0.3888	-0.0212	0.1838	0.2050
OD5	0.4362	-0.0420	0.1971	0.2391
OD6	0.4297	-0.0089	0.2104	0.2193
OD7	0.4152	-0.0115	0.2019	0.2133
ID1	0.4718	0.0339	0.2529	0.2190
ID2	0.4437	0.0043	0.2240	0.2197
ED1	0.4348	0.0145	0.2247	0.2101
ED2	0.4205	0.0695	0.2450	0.1755

(14) $\quad \sum_{j=1}^{n} \tilde{V}_{ij} = D_i$

(15) $\quad \sum_{i=1}^{n} \tilde{V}_{ij} = R_j$

To identify causal factors, R_j, D_i, and $D_i - R_j$ are calculated using Equations (14) and (15), and the resulting values are presented in Table 10.

Table 10

Identification of Causal Factors

Factor	$D_i - R_j$	Factor Type
OD1	-0.0213	Effect (Dependent)
OD2	-0.0248	Effect (Dependent)
OD3	0.0074	Cause (Driving)
OD4	-0.0212	Effect (Dependent)
OD5	-0.0420	Effect (Dependent)
OD6	-0.0089	Effect (Dependent)
OD7	-0.0115	Effect (Dependent)
ID1	0.0339	Cause (Driving)
ID2	0.0043	Cause (Driving)
ED1	0.0145	Cause (Driving)
ED2	0.0695	Cause (Driving)

In the cause–effect diagram, the X-axis represents $(D_i + R_j)^{def}$, which is always positive and indicates the weight or importance (prominence) of the factor within the system. The Y-axis represents $(D_i - R_j)^{def}$, which is interpreted as the net influence ratio in the system: if positive, the factor is a definitive driving (influencing) factor; otherwise, it is a definitive dependent (influenced) factor.

As indicated in Table 9, the component Individual Motivations (ID1), which has the highest $D + R$, exhibits the greatest interaction with other indicators. Moreover, the component Distal Environment (ED2), which has the highest $D - R$, exerts the strongest influence (penetration) on other indicators.

In addition, based on the obtained results, the analysis of the research dimensions is presented below in Tables 11 and 12.

Table 11

Defuzzified Matrix of Research Dimensions

TD	Organizational Dimensions	Individual Dimensions	Environmental Dimensions
Organizational Dimensions	0.0179	0.0204	0.0180
Individual Dimensions	0.0239	0.0162	0.0193
Environmental Dimensions	0.0233	0.0220	0.0140

Table 12

Computations of D_i and R_j for Research Dimensions

R& D	Organizational Dimensions	Individual Dimensions	Environmental Dimensions
(Importance) $D + R$	0.121518	0.117986	0.110596
(Net Effect) $D - R$	-0.008728	0.000790	0.007938
(Dependence) D	0.056395	0.059388	0.059267
(Influence) R	0.065123	0.058598	0.051329

To identify causal dimensions, R_j, D_i, and $D_i - R_j$ are computed using Equations (14) and (15), and the results are provided in Table 13.

Table 13

Identification of Causal Dimensions

Item	Organizational Dimensions	Individual Dimensions	Environmental Dimensions
$D_i - R_j$	-0.008728	0.000790	0.007938
Dimension Type	Effect (Dependent)	Cause (Driving)	Cause (Driving)

The dimension Organizational Dimensions has the highest value of $D + R$, indicating the greatest interaction with the other dimensions. The dimension Environmental Dimensions has the highest value of $D - R$, indicating the greatest influence (penetration) on the other dimensions.

To obtain the influence weights of the eleven components and three dimensions and to identify the most important dimensions and components of human resource development in NGOs, the study employed DANP, which integrates DEMATEL-based influence network construction with ANP-based weighting. Based on the influence network derived from DEMATEL, DANP was applied as shown in Tables 14 and 15.

Empirical findings indicate that experts place greater emphasis on the Promotion System (OD5), the Distal Environment (ED2), and Individual Motivations (ID1). The results demonstrate that the weights assigned to the Promotion System, the Distal Environment, and Individual Motivations are higher than those of other factors.

Table 14

Final Weight Matrix in the DANP Method

CRITERIA	OD1	OD2	OD3	OD4	OD5	OD6	OD7	ID1	ID2	ED1	ED2
OD1	0.03724	0.03724	0.03724	0.03724	0.03724	0.03724	0.03724	0.03724	0.03724	0.03724	0.03724
OD2	0.09372	0.09372	0.09372	0.09372	0.09372	0.09372	0.09372	0.09372	0.09372	0.09372	0.09372
OD3	0.00610	0.00610	0.00610	0.00610	0.00610	0.00610	0.00610	0.00610	0.00610	0.00610	0.00610
OD4	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500	0.07500
OD5	0.15022	0.15022	0.15022	0.15022	0.15022	0.15022	0.15022	0.15022	0.15022	0.15022	0.15022
OD6	0.08572	0.08572	0.08572	0.08572	0.08572	0.08572	0.08572	0.08572	0.08572	0.08572	0.08572
OD7	0.07803	0.07803	0.07803	0.07803	0.07803	0.07803	0.07803	0.07803	0.07803	0.07803	0.07803
ID1	0.12780	0.12780	0.12780	0.12780	0.12780	0.12780	0.12780	0.12780	0.12780	0.12780	0.12780
ID2	0.08045	0.08045	0.08045	0.08045	0.08045	0.08045	0.08045	0.08045	0.08045	0.08045	0.08045
ED1	0.12653	0.12653	0.12653	0.12653	0.12653	0.12653	0.12653	0.12653	0.12653	0.12653	0.12653
ED2	0.13919	0.13919	0.13919	0.13919	0.13919	0.13919	0.13919	0.13919	0.13919	0.13919	0.13919

The inconsistency ratio (I.R) is a mechanism through which the credibility of respondents' answers is assessed. Almost all computations are based on the decision-maker's initial judgments, and any error or inconsistency in comparing and determining the relative importance of alternatives and indicators can distort the final results obtained from the calculations. The inconsistency ratio (I.R) is calculated by dividing the inconsistency index (I.I) by the random index (IR).

If the consistency ratio is 0.10 or less, it indicates consistency in the pairwise comparisons and confirms the validity of respondents' judgments. In the present study, the inconsistency ratio was calculated using the following equation:

$$\lambda_{\max} = \frac{\sum_{j=1}^{n} \left(\frac{\sum_{k=1}^{n} w_k \, a_{jk}}{w_j} \right)}{n} \quad j = (1,2,\dots,n), k = (1,2,\dots,n)$$

Table 15

Inconsistency Coefficient for the Main Criteria Under Study

Acceptance/Rejection	Acceptable Value	Inconsistency Coefficient	Variable Under Study
Accepted	I.R ≤ 0.1	0.0433	Factors under study relative to the objective

As can be seen, based on the above equation, the inconsistency coefficient for the examined criteria is less than 0.10 and is therefore considered acceptable.

Based on the final weights reported in Table 16, the results indicate that among the components of human resource development in non-governmental organizations (NGOs), the Promotion System ranked first with a weight of 0.1502 and plays the greatest role in strengthening and sustaining human capital. It was followed by the Distal Environment with a weight of 0.1392 and Individual Motivations with a weight of 0.1278, ranking second and third, respectively. This pattern reflects the simultaneous importance of macro-level institutional contexts and internal motivational drivers in the human resource development process. In contrast, the Education and Development System received the lowest weight (0.0061), which may indicate institutional ضعف or the immaturity of formal training/development structures in these organizations. The remaining components—including the Training System, Compensation and Retirement System, Organizational Characteristics, Personal Characteristics, Performance Evaluation System, and Recruitment and Deployment System—were positioned in the middle ranks. At the dimension level, the findings show that Organizational Dimensions ranked first with a weight of 0.5260, Environmental Dimensions ranked second with a weight of 0.2657, and Individual Dimensions ranked third with a weight of 0.2083. This ordering suggests that human resource development in NGOs is influenced primarily by intra-organizational structural and managerial mechanisms, while environmental conditions and individual characteristics play complementary and reinforcing roles.

Table 16

Final Weight and Ranking of Dimensions and Components of Human Resource Development in Non-Governmental Organizations

Dimensions	Symbol	Weight	Rank	Components	Symbol	Weight	Rank
Organizational Dimensions	OD	0.5260	1	Recruitment and Deployment System	OD1	0.0372	10
				Training System	OD2	0.0937	5
				Education and Development System	OD3	0.0061	11
				Performance Evaluation System	OD4	0.0750	9
				Promotion System	OD5	0.1502	1
				Compensation and Retirement System	OD6	0.0857	6
				Organizational Characteristics	OD7	0.0780	8
Individual Dimensions	ID	0.2083	3	Individual Motivations	ID1	0.1278	3
				Personal Characteristics	ID2	0.0804	7
Environmental Dimensions	ED	0.2657	2	Proximal Environment	ED1	0.1265	4
				Distal Environment	ED2	0.1392	2

Discussion and Conclusion

The present study sought to identify and prioritize the components of a systematic model for human resource development (HRD) in non-governmental organizations (NGOs) and to analyze the causal relationships among organizational, individual, and environmental dimensions influencing human capital sustainability. The findings revealed that HRD in NGOs is primarily shaped by organizational mechanisms, followed by environmental conditions and individual factors. These results provide important theoretical and practical insights into how nonprofit organizations can strengthen institutional effectiveness through structured human resource systems.

The results demonstrated that organizational dimensions obtained the highest overall weight among the three main dimensions, indicating that internal organizational structures and management systems constitute the primary drivers of HRD in NGOs. This finding aligns with strategic HRD theory, which emphasizes that organizational performance and sustainability depend on the alignment between institutional processes and human capital capabilities [4]. NGOs, despite their social mission orientation, increasingly require formalized management structures to ensure accountability, continuity, and operational efficiency. Previous research highlights that professional HR management systems enhance organizational legitimacy and effectiveness within nonprofit institutions [5]. The dominance of organizational factors in the present study therefore confirms that mission commitment alone is insufficient without structured organizational support mechanisms.

Among all identified components, the promotion system ranked first, indicating that transparent career advancement pathways play the most influential role in strengthening human resource sustainability. This finding suggests that employees and volunteers in NGOs are highly sensitive to perceived fairness, professional growth opportunities, and recognition systems. Strategic HR maturity literature similarly emphasizes that career progression systems foster organizational commitment, motivation, and knowledge retention [8]. Furthermore, studies on leadership and innovation demonstrate that advancement opportunities encourage learning behaviors and innovation capacity within organizations [20]. In NGOs, where financial incentives may be limited, promotion mechanisms function as symbolic and developmental rewards that reinforce employee engagement and long-term organizational attachment.

The second most influential component identified was the distal environment, highlighting the decisive role of macro-level institutional and policy contexts. NGOs operate within complex regulatory, financial, and societal environments, and their HRD outcomes are significantly affected by government policies, legal frameworks, and public attitudes toward civil society. Research on NGO–government relations confirms that supportive institutional environments enhance nonprofit capacity-building and service effectiveness [1, 10]. Similarly, collaborative governance studies emphasize that intersectoral cooperation strengthens organizational learning and resource mobilization capabilities [9]. The strong influence of environmental factors observed in this study indicates that HRD cannot be understood solely as an internal organizational process but must be viewed as an ecosystem-based phenomenon shaped by external institutional conditions.

The high ranking of individual motivations further demonstrates the centrality of intrinsic psychological drivers in NGO workforce dynamics. Unlike commercial organizations, NGO employees often join institutions due to value-based motivations such as altruism, social responsibility, and community commitment. Previous studies have shown that intrinsic motivation significantly influences employee retention and organizational citizenship behaviors in nonprofit environments [6]. Human resource development frameworks emphasizing identity, self-concept, and professional meaning also support the idea that individual motivation functions as a core foundation of HRD effectiveness [14]. However, the findings suggest that motivation

alone is insufficient; organizational systems must actively sustain and reinforce these motivations through supportive policies and development opportunities.

The causal analysis revealed that environmental and individual dimensions act as driving factors, whereas many organizational components function as dependent outcomes within the HRD system. This result indicates that organizational HR practices evolve in response to broader environmental pressures and workforce characteristics. Cultural and societal values influence HR development patterns by shaping expectations regarding leadership, participation, and collaboration [13]. Similarly, innovation and organizational learning literature suggests that adaptive institutions continuously adjust internal systems in response to environmental complexity and stakeholder demands [12]. Thus, NGOs must adopt flexible HRD strategies capable of integrating environmental uncertainty with internal organizational planning.

Another notable finding concerns the relatively low ranking of the education and development system, which received the smallest weight among components. This outcome may reflect structural weaknesses in formal training programs within NGOs, where learning often occurs informally through experience rather than systematic professional development. Previous research has identified similar patterns, indicating that many NGOs lack institutionalized training infrastructures despite recognizing their importance [15]. The absence of structured training mechanisms may limit long-term leadership development and organizational knowledge transfer. Studies on professional standards and competency frameworks argue that formal learning systems are essential for workforce adaptation in rapidly changing technological environments [16]. Therefore, strengthening educational structures represents a key opportunity for enhancing HRD maturity in NGOs.

The mid-level ranking of components such as performance evaluation, recruitment systems, and compensation structures reflects the hybrid organizational nature of NGOs. Recruitment processes in nonprofit institutions often prioritize mission alignment over technical competency, which can create gaps between organizational needs and workforce capabilities. Sociological analyses of charitable institutions similarly indicate that informal recruitment practices may undermine long-term organizational efficiency [3]. The present findings suggest that professionalizing recruitment and performance evaluation systems can significantly improve HRD outcomes while preserving mission-driven values.

Digital transformation and technological development also provide important interpretive context for the results. Contemporary HRD scholarship highlights the growing influence of artificial intelligence, digital platforms, and data-driven decision-making in workforce management [17, 18]. Although NGOs traditionally adopt technology more slowly than private firms, digital HR systems can enhance transparency, learning, and organizational coordination. Studies examining strategic HRM and supply chain resilience confirm that technology adoption strengthens organizational agility and adaptive capacity [19]. Consequently, integrating digital tools into HRD practices may amplify the effectiveness of organizational and environmental interactions identified in this research.

The findings also reinforce the importance of collaborative and participatory governance approaches in HRD. NGOs frequently operate within networks involving communities, governments, and private actors, requiring employees to possess relational competencies and collaborative skills. Research on social participation demonstrates that community engagement strengthens organizational legitimacy and collective problem-solving capacity [2]. Similarly, studies on social enterprises show that strategic HR practices must accommodate stakeholder diversity and participatory management structures [7]. The systematic HRD model proposed in this study therefore supports the transition from individual-centered HR practices toward network-oriented human resource development.

From a sustainability perspective, the findings confirm that HRD functions as a central mechanism for achieving long-term organizational resilience. Sustainable HRM frameworks emphasize balancing employee well-being, organizational performance, and societal impact [22]. NGOs, whose missions inherently address social sustainability, require HR systems capable of supporting employee commitment while adapting to environmental uncertainties. Innovation-oriented HRD models further suggest that developing entrepreneurial competencies and knowledge-sharing cultures strengthens organizational adaptability [23]. The integrated model identified in this study reflects this multidimensional understanding of HRD as a dynamic interaction among structure, context, and human agency.

Overall, the study contributes to HRD theory by empirically demonstrating that effective human resource development in NGOs emerges from the interaction between organizational infrastructure, environmental conditions, and individual motivational factors. The prioritization results highlight the need for NGOs to move beyond informal management approaches toward strategic and systematic HR development frameworks capable of ensuring institutional sustainability and social impact.

This study is subject to several limitations. First, the sample consisted exclusively of expert participants, which may limit the generalizability of findings to broader NGO populations or operational staff perspectives. Second, the research design relied on expert judgment and multi-criteria decision-making techniques, which, although methodologically robust, remain influenced by subjective evaluations. Third, contextual factors specific to the institutional and cultural environment of the studied NGOs may restrict the transferability of results to other national or organizational contexts. Finally, the cross-sectional nature of the study does not capture dynamic changes in HRD systems over time.

Future studies may expand the present model by incorporating longitudinal research designs to examine how HRD components evolve across organizational life cycles. Comparative studies across different countries or sectors could further clarify the contextual variability of HRD determinants in nonprofit organizations. Researchers may also integrate quantitative employee-level data to complement expert-based analyses and test causal relationships using structural modeling techniques. Additionally, future investigations could explore the role of digital transformation, remote collaboration, and artificial intelligence in reshaping HRD practices within NGOs.

Managers of non-governmental organizations should prioritize the development of transparent promotion systems and structured career pathways to enhance employee motivation and retention. Organizational leaders are encouraged to formalize recruitment, performance evaluation, and training mechanisms while maintaining mission-oriented values. Strengthening collaboration with governmental and institutional actors can improve environmental support for HR development initiatives. NGOs should also invest in leadership development, continuous learning programs, and technology-enabled HR practices to increase organizational agility and sustainability. Finally, fostering a supportive organizational culture that recognizes individual motivations and encourages participation can significantly enhance long-term human capital stability.

Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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