



Using the fuzzy decision hierarchy technique to evaluate the human resources development factors by using the approach of training and improvement

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Article	Abstract
<p>Article history: Received: 11th November 2022 Received in revised form: 02th December 2022 Accepted: 25th December 2022</p> <hr/> <p>Keywords: Stress Management Strategy, Performance, Health, Human Resources, Banking Industry</p>	<p>One of the most worrying and challenging topics in today's world is development issues. Development can permeate any scientific and non-scientific principles. One of the most important branches that can be discussed and have unique characteristics is the development of human resources. The development of human resources is possible with the aim of improvement and through training. Therefore, the aim of this research is to evaluate the factors of human resource development with the approach of training and improvement using the FAHP method. For this purpose, by asking the opinion of 10 experts and refining the factors and checking their compatibility rate (validity and reliability), and then de-fuzzifying the factors, the results indicated that the injection of a systematic approach from 82 research factors, the first rank, and the favorable physical structures rank in order to produce science in this field, a comprehensive model like the structure of the earth was presented.</p>

1. Introduction

Human resources in organizations have a very high position and importance, because the productivity and efficiency of organizations depends on the quality of their human resources. As much as the human resources of the organizations have higher capabilities, skills, specialized knowledge and creativity, they can better help the organizations in reaching their goals [1, 2]; Therefore, there are many reasons that have made the need to improve and develop these valuable resources inevitable, including rapid changes and transformations in human science and technology, exposed to aging and incapacity of human resources, and possibly leaving the organization due to retirement or leaving mentioned in other organizations [2].

In the advanced industrial world, among the three wealth-generating factors of natural resources, physical resources and human resources, human resources have given them the most attention, benefit and profitability. Experts and scientists believe that man is the center of development [3]. Qualified and skilled human resources are the factor or value and endless capital for the growth and development of organizations and countries, and are the biggest capital of a country and the main factor of its progress. In the past, labor, capital and land were considered the main factors of production, but today technological changes, manpower and increased productivity are considered as factors of growth and development [4].

Due to the importance, contribution and role of knowledge and skills of human resources in the performance of individuals and organizations, most leading and successful organizations make extensive investments for training and improving their human resources [5]. Training is one of the most important tools for human resource

development, and knowledgeable and successful managers understand the need for training and consider human resource development as one of the organizational requirements [6]. Achieving the organization's goals depends on the employees' ability to perform assigned tasks and adapt to the changing environment. The implementation of training and improvement of human resources makes people able to effectively continue their activities and increase their efficiency in accordance with organizational and environmental changes [7]. Managers of organizations have views and orientations towards the training and improvement of employees, and these orientations are also different, some agree and support it, and others are against the training and improvement of employees, which causes a challenge [8]. Regarding the subject of training and improvement of employees, it has caused that this important and vital issue is not given serious attention and is neglected. However, implementing strong human resource development programs is a critical requirement [9].

Research Methods

The FAHP (Fuzzy Hierarchical Analysis Process) is the fuzzification of the classic AHP method using numbers and fuzzy calculations. Therefore, when priorities show uncertainty and imprecision, precise numbers are not very suitable for showing time judgment. To resolve the ambiguity, triangular fuzzy numbers and AHP have been integrated in the fuzzy method to solve decision-making problems [10].

This method, which is based on the arithmetic mean of experts' opinions and the hourly normalization method and developed using fuzzy triangular numbers, has been welcomed by researchers. In order to get experts' opinions on the matrix of pairwise comparisons, information is collected using a questionnaire. Questionnaires are designed to allow respondents to determine the importance of each of them by comparing the criteria and sub-criteria in pairs in their own group. To measure the validity of the questionnaire, the opinions of academic experts are used [11].

To calculate the compatibility rate $CR=CI / RI$ random parameters of R_m and R_g . If both (CR_m and CR_g compatibility rate) each paired comparison matrix is bigger than 0.1. It should be requested from the expert to reconsider his/her preferences [12-15].

After collecting the answers of the experts in the form of verbal items, the said answers should be converted into a fuzzy scale. The scale used in this research is the 3-point fuzzy scale (pairwise comparison matrix) proposed by Kaul and Verma based on the hourly scale. Generally, triangular fuzzy numbers are presented as (l, m, u) where the parameters l, m, u are the smallest possible expected value, the most likely expected value, and the largest possible expected value, respectively. Therefore, it can be said:

$$\mu\left(\frac{x}{M}\right) = \begin{cases} 0 & x < l \\ \frac{x-l}{m-l} & l \leq x \leq m \\ \frac{u-x}{u-m} & m \leq x \leq u \\ 0 & x > u \end{cases}$$

In this research, in order to calculate the weight in pairwise comparisons, verbal expressions and triangular fuzzy numbers listed in the table 1 have been used.

Table 1 Triangular Fuzzy Numbers

Verbal equivalent	Reversed Fuzzy equivalent	Fuzzy equivalent
Same preferences	(1,1,1)	(1,1,1)
Intermediary	(1/3,1/2,1)	(1,2,3)
A little preferred	(1/4,1/3,1/2)	(2,3,4)
Intermediary	(1/5,1/4,1/3)	(3,4,5)
Preferred a lot	(1/6,1/5,1/4)	(4,5,6)
Intermediary	(1/7,1/6,1/5)	(5,6,7)
Preferred a lot	(1/8,1/7,1/6)	(6,7,8)

Intermediary	(1/9,1/8,1/7)	(7,8,9)
Completely preferred	(1/9,1/9,1/9)	(9,9,9)

The evaluation of human resources development factors in this research is from two aspects of identifying the factors and then prioritizing the factors. Therefore, there are existing and effective factors and some factors are suggested, this leads to the coherence of human resource development programs.

Research findings

Many factors were identified by the experts, but only 82 items can be evaluated based on the compatibility and validity rates of the experts. In table (2) these factors are displayed in no particular order:

Table 2 Main factors

No	Factors
1	Timely job rotation
2	Support of senior managers
3	Meritocracy and merit selection
4	Create a specific career path
5	Injecting a systemic attitude
6	New electronic equipment
7	Trust building and organizational commitment
8	Safety and health of the workplace
9	Coherence of organization's learning circles
10	Performance evaluation and feedback
11	Increasing the quality of working life of employees
12	Synergy of communication and cooperation
13	Specialization
14	Standardization of education
15	Risk taking
16	Favorable physical structures
17	Environmental scanning
18	Primary and secondary socialization
19	Promote EFQM
20	Clarification and persuasion
21	Opportunities and promotion
22	Creating healthy competition
23	Continuous needs assessment
24	Update information
25	Investing in individual abilities and capabilities
26	Mining optimization
27	Educational and research facilities
28	Subjective perceptions and brand image

The identified final factors, after defuzzification of the initial weights and in order to achieve the final weights and the final rank of that criterion, are unveiled in the format of the final priorities table (Table 3).

Table 3 Factors' rank and weights

	Factors	Initial weight	final weight	rank
C1	Injecting a systemic attitude	0.304	0.088	1
C2	Clarification and persuasion	0.218	0.63	2
C3	Safety and health of the workplace	0.093	0.027	20
C4	Timely job rotation	0.215	0.036	15
C5	Environmental scanning	0.128	0.037	12
C6	Opportunities and promotion	0.131	0.038	10
C7	Primary and secondary socialization	0.216	0.037	11
C8	Performance evaluation and feedback	0.146	0.025	21
C9	New electronic equipment	0.213	0.037	13
C10	Promote EFQM	0.206	0.036	16
C11	Support of senior managers	0.111	0.019	25
C12	Increasing the quality of working life of employees	0.108	0.019	27
C13	Create a specific career path	0.298	0.061	3
C14	Synergy of communication and cooperation	0.22	0.045	5
C15	Update information	0.152	0.031	17
C16	Creating healthy competition	0.137	0.028	19
C17	Standardization of education	0.102	0.021	23
C18	Favorable physical structures	0.09	0.019	28
C19	Meritocracy and merit selection	0.208	0.039	8
C20	Subjective perceptions and brand image	0.158	0.03	18
C21	Specialization	0.215	0.04	7
C22	Coherence of organization's learning circles	0.196	0.037	14
C23	Risk taking	0.12	0.022	22
C24	Mining optimization	0.104	0.02	24
C25	Trust building and organizational commitment	0.334	0.049	4
C26	Continuous needs assessment	0.258	0.038	9
C27	Educational and research facilities	0.127	0.019	26
C28	Investing in individual abilities and capabilities	0.28	0.041	6

The ranking results indicate that, in order of injecting a systemic attitude, clarifying and persuading, creating a clear career path, building trust and organizational commitment, synergistic communication and cooperation, investing in individual abilities and capabilities, specialization, meritocracy and merit selection, continuous needs assessment, opportunity creation and promotion, primary and secondary socialization, environmental scanning, modern electronic equipment, integration of learning circles of the organization, timely job rotation, promoting EFQM, updating information, mental perceptions and brand imagery, space creation healthy competition, safety and health of the workplace, evaluation of performance and feedback, risk taking, educational standardization, optimization of explorations, support of senior managers, educational and training facilities, increasing the quality of working life of employees and favorable physical structures, among the existing or proposed effective factors for promotion The level of development of human resources.

Discussion and conclusion

Looking at the comprehensive human resources development model, we can imagine that this model behaves like the Earth. This model includes three general layers: core, mantle and shell. It seems that these three layers are prioritized according to their importance. There may be connections and interactions between the factors of each layer, but with a comprehensive look at the totality of factors

It is possible to reach a desired level of improvement in any kind of puzzle. Processing each factor in its context is a vital need, but this is not enough and the synergy of factors must be considered together for organizational goals; Therefore, like the earth, all components (core, mantle and shell) fight for the success of the whole (earth) and examining the behavior of each component alone is meaningless. and the injection of a systemic attitude in all the lower and upper members; therefore, until this important thing is not achieved, the understanding of other factors will suffer. Clarity and persuasion of employees is formed with management mechanisms based on the goal (MBO) and the common vision of employees and managers. A clear career path involves vertical development, timely job rotation, enrichment and even horizontal development. If the organization gains trust and prevents damage, it will automatically fulfill primary and secondary obligations and this itself, it will lead to primary and secondary socialization. A platform for healthy competition should be provided so that this competition creates camaraderie and causes synergy in communication and interactions. One of these competitive mechanisms is educational and research facilities that people They can always consider the spirit of learning and updating their information, and it seems that such people are They can seize opportunities and upgrades, and this in itself means the development of human resources with an educational approach to reach the desired level of improvement. When employees see the support of senior managers, evaluation of their performances and feedback (being seen), they will develop their personal and inherent capabilities, mental perception and image of the brand in pursuit of greater risk-taking, environmental scanning, and examination of successful and similar Bench models. Marking) to promote their expertise and competence to reach standards such as EFQM. The presence of occupational safety and health, stable processing and improvement of the quality of work life of employees, favorable physical structures such as modern electronic equipment will lead to the promotion and development of human resources.

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