

Impact of Green HRM Practices on Employees opinion and Curricula Vita in Selected Steel Industries of Chhattisgarh using Neuro-Fuzzy Model for Sustaining Green Human Resource Management

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Abstract:

As in present scenario, everybody is moving towards building smart and environmental friendly organizations, Green HRM is playing a fundamental role towards the integration of corporate environmental management into human resource management. There is an increasing need for combining environmental management into Human Resource Management (HRM) which the experts termed as “Green HRM”. To attain the same, ‘Green HRM’ is emerging as a recent initiative that promotes environment concerned Human Resources practices. Through Green Human Resources practices, firms seek to produce the environmental awareness and commitment for greener world, among employees and society. The Greening of Human Resource policies include methods of environmentally friendly "green" initiatives that organizations are utilizing, involving their workforce and human resource practices. The present paper makes an effort for discuss the Impact of Green HRM Practices on Employees opinionand Curricula Vitain Selected Steel Industries of Chhattisgarh using Neuro-Fuzzy Model for Sustaining Green Human Resource Management.The study will analyze the emergence of Neuro-Fuzzy Modelin green HRM process and the potential benefits of Neuro-Fuzzy Modelthrough secondary data. The paper generates insights on the utilization of technology for conversion of effective HR into sustainable HR.

Ranking techniques and applicant choice for employment roles within Human Resources include very high levels of uncertainty. Hence, there's a need to create a unit which is going to enable Human Resource departments to ascertain the most crucial needs criteria for a certain work, based on the personal preferences of various professionals, while making certain the expert's choices are impartial and properly weighted based on their expertise and knowledge. A Neuro Fuzzy style based method for identifying the primary key ability attributes determining each

expert's preferences and ranking choices, while managing the concerns as well as inconsistencies in team choices of a panel of professionals.

Keywords:

Neuro-Fuzzy, Human Resources Management, Green HRM, Sustainability, Greening of Human Resource policies

1. Introduction

In today's rapidly converting globalized business world Researchers have opined that businesses have to be aware of social and environmental elements along with budget friendly and financial factors so that you can sustain and live on (Govindarajulu & Daily 2004). Daily and Huang (2001) also opined that organizations essentially need to stability the commercial boom and ensuring that the environment in which one lives is nicely preserved and promoted. Green HRM is the concept which promotes sustainable practices via growing employees' awareness and commitments on sustainability. It entails adopting and implementing environment-pleasant HR projects, a good way to attain extra efficiencies, and better employee engagement. The green control may additionally result in a company's stronger operational overall performance (Jackson et al., 2012), greater teamwork (Jabbour et al., 2010), advanced organizational lifestyle (Jabbour et al., 2012) and reduced cost (Hart 1997). HR practices, being implemented in line with the lifestyle and enterprise approach, need to make a contribution in the direction of organizational performance (Boselie et al, 2001). Thinking about this, researchers supply importance to adoption of environmental practices as a key goal of organizational functioning making it important to discover with the help of human resource management practices (Jackson et.al., 2011; Daily and Hung, 2001; Sarkis et al., 2010). since inexperienced HRM goals to combine HRM methods with organizational techniques of sustainability, it may encompass strict recruitment techniques (Grolleau et al., 2012), appraisal and praise structures linked with the environmental focus and implementation of their assessment method (Jabbour et al., 2012) and training and empowerment programs (Unnikrishnan and Hedge 2007), so that you can enable the development of recent set of competencies and abilities among the personnel of "seasoned-inexperienced" companies (Cherian & Jacob, 2012).

We are truly witness of change in the nature of jobs. Muscle jobs are disappearing and brain jobs are growing as well as labor-based industries have been comes through skill-based industries and will have to be replaced by knowledge-based industries. As Neuro-Fuzzy Model is a new concept in emerging technology, similarly the concept of green human resources has emerged to

conserve environmental resources, resulting in ensuring environmental sustainability while at the same time developing business and increasing productivity. Neuro-Fuzzy reasoning is helping companies in coordinating distinctive framework and furthermore gives a stage which can bolster all functions of Human Resource from recruitment, selection, training, development, compensation and performance management is not a single unit to work for the organization and helping companies to go green in these functions. Neuro-Fuzzy framework can work for applicant screening, worker commitment, re – commitment, career development and so forth. Knowledge, abilities & competencies associated with Human Resources have become a crucial carrier for a business to establishing a competitive advantage. Consequently, Human Resource management is starting to be a lot more plus more vital, since it aims at blowing the entire power of the workers towards attaining the strategic objectives of an enterprise. To be able to attain these aims, Intelligent Computing Models ought to be utilized. Smart Computing Models are associated with the negotiated associations between earnings and danger during an asset and are usually used in finance.

In this regard, Neuro-Fuzzy version, a technique based on mathematical programming, can be used to compute as well as enhance the effectiveness scores of individual. Neuro-Fuzzy item makes the comparison simple by creating a single score for every device. Unlike ratio analysis, Neuro Fuzzy model can handle several inputs and several outputs. Authors proposed a Neuro Fuzzy system to effectively shortlist the published curricula vita of the applicants from a big data source of applications to create a consistent and fair continue ranking policy. The study used an impressive way to cope with the concerns as well as inconsistencies in the choices of specialists while simultaneously identifying the primary key skills depending on the experts' tastes and decisions for ranking the applicants.

2. Review of Literatures

The reason of going green is to use merchandise and methods that would not negatively impact the environment thru pollution or depleting natural sources (Robinson,2008). Researchers on this paper argued that environmental management machine can best be correctly carried out if the organizations have the proper people with the proper abilities and skills (each day and Huang, 2001). Strategic HRM researchers argued that to reap HR effectiveness, HR need to be practiced as a whole and should be aligned with the enterprise strategic dreams, the primary means via which firms can impact and shape the abilities, attitudes, and behavior of individuals to do their paintings and accordingly gain organizational goals (Collins and Clark, 2003). Previously, groups assumed that incorporating ‘green’ into their commercial enterprise approach might cost money, but they

now understand that ignoring bad impacts at the surroundings can be highly-priced in the destiny (Van der Zee, 2008). The topic of the inexperienced HRM is attracting increased attention among control students. There may be, for that reason, a developing need for the mixing of environmental control into HRM. Neuro-Fuzzy Model is used to:-

A. Research Design It is a descriptive research. A questionnaire was prepared. These questions were designed to assess the respondents “perception about the concept of Green HRM, and their awareness about the respective organizations” Green HR initiatives.

B. Sample The sample consists of 200 junior and senior executives, working in steel sector in Chhattisgarh and utmost care is taken to fill all 200 issued questionnaires. The work experience of those respondents varied between one and 20 years, in the selected industry.

So, sociotechnical theory seem to assume a balance relationship between social as well as technical, the last aspect has been a cause of controversy in society because intelligent machines are generally parallel to the man and it’s a subsequent cause of unemployment and green human resource. Therefore, for the success of company will require new management pedagogy which transforms the focus from social to social-technological perspectives, for ensuring that green human resource management.

3. Objectives of the study

- To find out whether the organization is providing awareness about Green HR Practices among the employees of steel industries in Chhattisgarh.
- To examine the perception of employees regarding implementation of Green HR Practices in the Organization.

4. Research Methodology

This paper is based on applied research. Research is conducted on the basis of secondary data collected through various articles and journal publications, In case of Applied theory of research, it is connected with real life research like research on increasing the effectiveness of a machine, production gain by an increase in the material quality, intensive control on pollution, introduction of new vaccination for diseases etc. These have large potential and as a result Green HRM was introduced. It is now majorly acceptable in the market by various changes in the HR policies.

Neuro-Fuzzy Model has played a major role in all sectors of the society, majorly Human resource management or HRM. Human resource management has grown in various areas and now it is also contributing in pollution control of the society. Recently, a Bengalurubased IT services company, an app called Ask Dexter is key to managing its 22,000-plus employees. The internal, cloud-based chatbot, developed two years back, is doing many HR functions: it resolves employee queries related to leave and company policies. It fields technical support queries and provides simple ways of employee appreciation across all levels of corporate hierarchy. It specialises in giving an overview of openings, and jobs that will be created in the future along with the preferred skills for each.

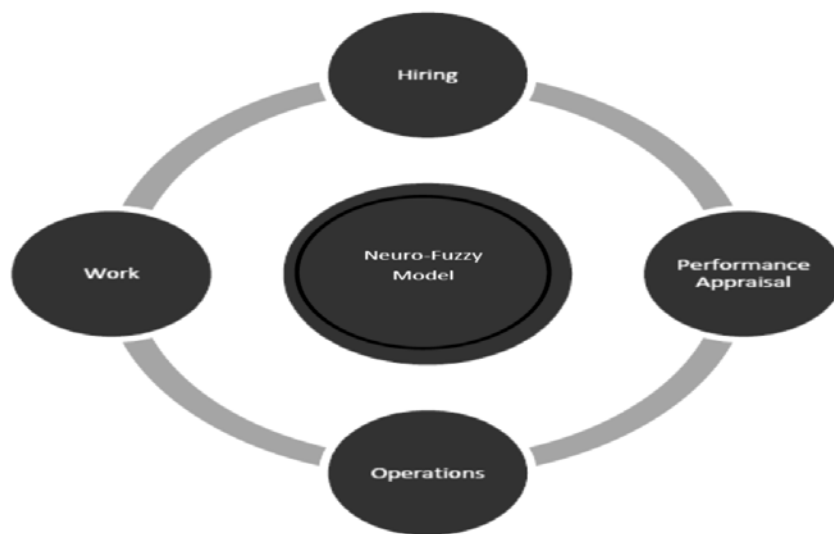


Fig.1 Model showing relationship of Neuro-Fuzzy Model with Green HRM

As per the above model (Fig.1) it is clear that Neuro-Fuzzy Model is helpful in various areas of the Green HRM and is directly supporting all the HR practices out of which few major practices are discussed below:

Hiring: Artificial intelligence helps parse and screen CV's on the basis of profile required better than humans and saves time as well.

Performance appraisal: Advanced software and data analytics helps in assessing a person's performance on a daily basis and not quarterly and half yearly. Appraisal is a continuous process and it should not be done on a yearly basis.

Operations: Various chat rooms and chat boards are available to resolve various employee queries and moreover various apps are introduced to generate instant solutions for employees and also for customers. Almost all parts of HR operations are now having components which are managed by technology.

Work force: Various IT companies are always looking for innovation and creativity, but till the time they are not going to restrict it companies will be hiring creative people which are a threat for the existing companies.

As per the current survey, more than 20% of the HR compliance is calculated by Green HRM and it is analyzed that the chances of error is reduced to minimum in case of using technology and percentage of human error is more.

Moreover, this process has reduced 55% - 60% of traditional recruiter's job and has made things more effective and time saving. Infact, this automation hastaken over majorly 80% of the HR helpdesk and is trying to convert it to 100% within a short span of time.

Motivation and Opportunity constructs under this there are some work system components that shape employee ability and contribute to the success of the industry. Organizational interests are best served by a system that attends to the employees' ability, motivation, and opportunity.

- Increases the ability of the employee
- Motivates employees
- Provides opportunities to contribute to the company

The steel industries uses these theoretical concepts to provide companies an excellent management tool that can calculate every employee's performance which further is a major contribution for the growth of the organization.

5. Motivating Green Employees

The process of performance management and its appraisal for employee management can present many challenges in order to measure the standards of environmental changes all through various organizational departments' and generating useful content on the major environmental performance of units and staff. Many companies are trying to understand this issue by upgrading their performance through environmental standards and starting installing various green information systems to check and effective utilization for the benefits of environmental performance.

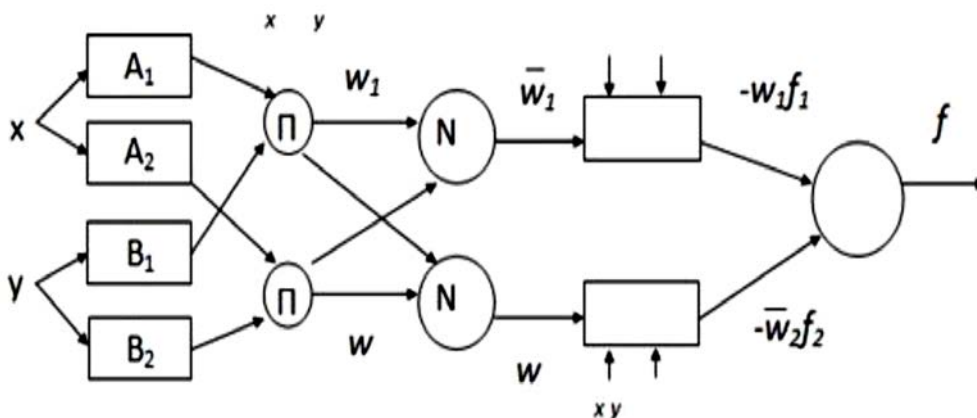


Fig.2 Neuro-Fuzzy Structure

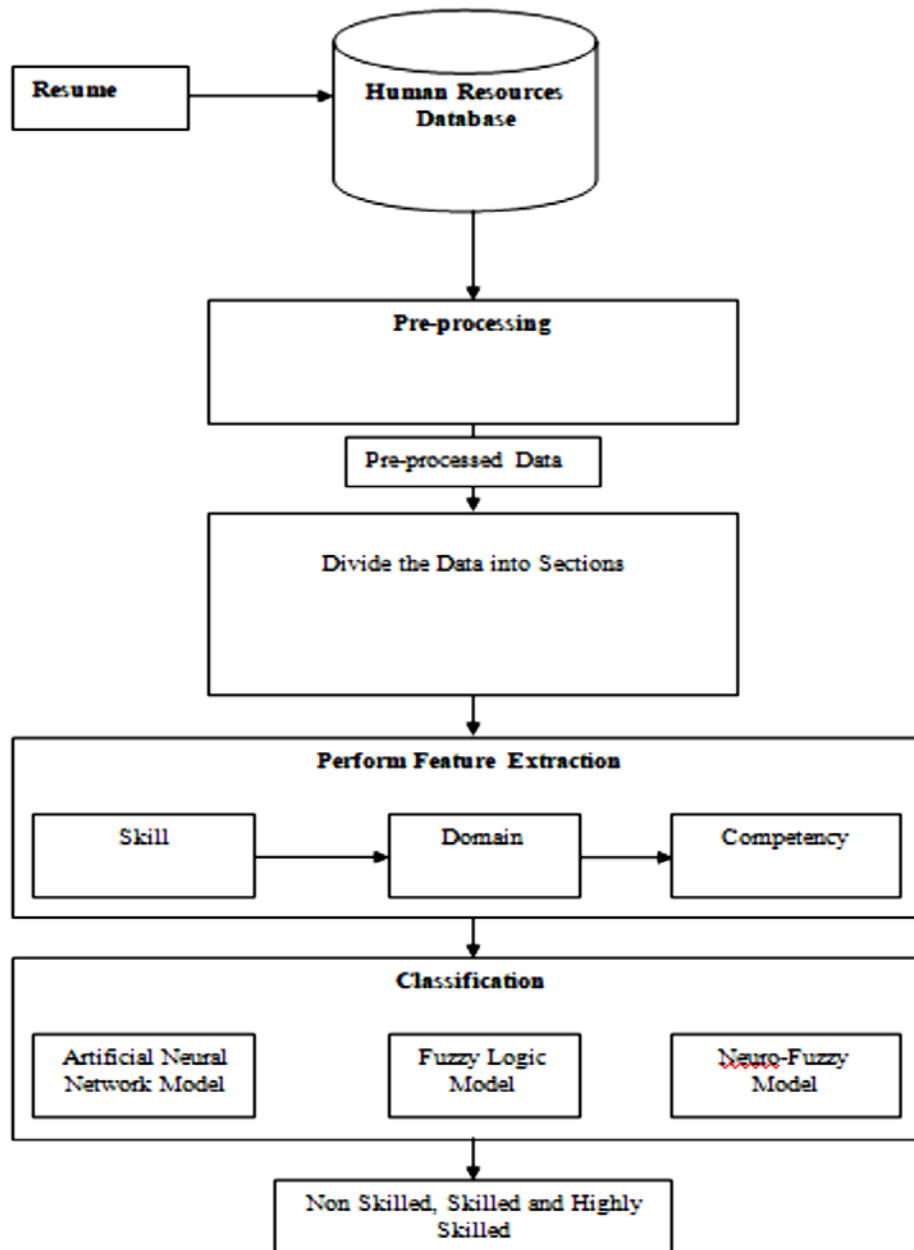


Fig.3 Proposed System

In this section, the overview of proposed system and methodology are explained. Neuro-Fuzzy structure is shown in Fig.2 and proposed system is shown in Fig.3.

Mean square error classification of Neuro-Fuzzy System for different criteria of Curricula Vita of employees: Following figures from fig.4 depicts the MSE classification models. The classification result is based on three classes such as Non Skilled, Skilled and Highly Skilled.

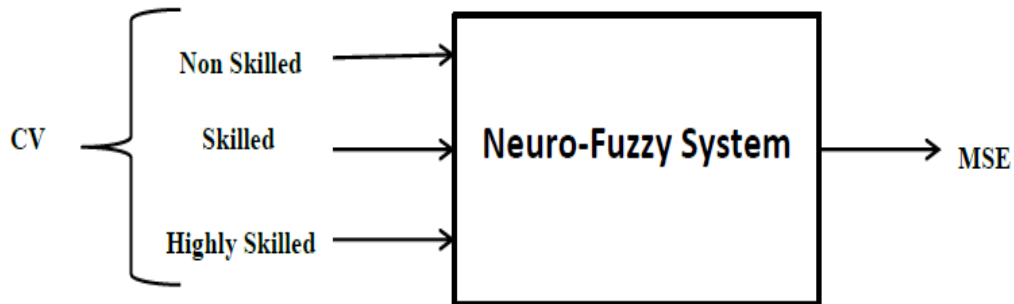


Fig.4 Neuro-Fuzzy Model for MSE Classification of employees CV considering Non-Skill, Skilled and Highly Skilled resumes

6. Experimental Results

The Performance evaluation of the proposed Human Resources classification model is discussed in this section. The proposed Human resources classification model is implemented in the soft-computing platform using MATLAB Software, Neuro-Fuzzy and Fuzzy Classifier were used to implement the three different models i.e. Neural Network, Fuzzy Logic and Neuro-Fuzzy Models. The datasets includes service sector human resources data, the datasets were collected from service sector organization. A total of 3000 resumes were randomly chosen for skill assessment. Since there are one category of Non Skill worker and two category of Skill Worker in the dataset, 3000 resume are chosen consisting of 1000 non skill workers and 1000 resumes for per skill category. The proposed Neuro-Fuzzy classification model is compared with the Fuzzy Logic and Artificial Neural Networks. The classification result is based on three classes such as Non Skilled, Skilled and HighlySkilled. In the classification problem, it is identified as positives the class and as negatives the class. Doing so, the following standard definitions are obtained: 1) True Positives (TP): predicts class as class. 2) True Negatives (TN): predicts non-class as class. 3) False Positives (FP): predicts non-class as non-class. 4) False Negatives (FN): predicts class as non-class. Based on performance measures are applied to calculate Sensitivity, Specificity, Accuracy and Mean Square Error. Skill assessment i.e. Non Skilled and Skilled are taken for classification thus, the performance measures will be evaluated using these criteria and formulas are shows as follows:

Accuracy

Accuracy symbolizes the ability of the model to differentiate the non skilled and skilled resume correctly. To evaluate the accuracy of a model, one should calculate the proposition of True positive, True Negative, False Positive and False Negative.

$$Accuracy = (TP + TN) / (TP + TN + FN + FP)$$

Specificity

Specificity symbolizes the ability of the model to define the non skilled resumes correctly. To evaluate the specificity of a model, one should calculate the proportion of True Negative in non skilled resume.

$$Specificity = (TN) / (TN + FP)$$

Sensitivity

Sensitivity symbolizes the ability of the system to define the Highly Skilled and skilled resume correctly. To evaluate the sensitivity of a system, one should calculate the proportion of True Positive in highly skilled and skilled resumes.

$$Sensitivity = (TP) / (TP + FN)$$

Mean Square Error (MSE)

Mean Square Error is used to measure the difference between the expected parameter and the perceived parameter, which paves the way for the researcher to make some decisions.

$$Mean\ Square\ Error\ (MSE) = \frac{1}{mn} \sum_{i=0}^{m-1} \sum_{j=0}^{n-1} [I(i,j) - K(i,j)]^2$$

7. Results and Discussion (Matters to be merged as per title)

Table 1 Experimental Result for the Classification Methods Using Mean Square Error

Curricula Vita CV) Used	Comparison of Mean Square Error (MSE) of Models used		
	Neural Network	Fuzzy Logic	Neuro-Fuzzy
CV1	2.96	3.55	1.71
CV2	2.57	3.34	1.65
CV3	2.03	3.11	1.53
CV4	2.24	3.87	1.49
CV5	2.87	3.64	1.09
CV6	2.39	3.41	1.13

Here the performance of the proposed system was compared with the system generated by Fuzzy Logic and Neural Networks. Here Fuzzy Logic and Neural Networks shows greater error rate while comparing with the proposed Neuro-Fuzzy Model.

The collected data were analyzed using suitable tools and presented

Table 2: Showing the Mean value and Standard Deviation value of employee’s opinion on the Green Working Environment

Category of Green Working Environment	Mean Value	SD Value
Comfortable Space	4.44	0.745
Environmental Friendly	4.35	0.938
Formal/Informal Policy	4.27	0.858
Telecommuting	4.19	0.882
Green Suggestion	3.22	1.548

Source:

Computed form primary data Management provides a very comfortable and relaxed space for employees to have their lunch which secures the top rank with a mean score of 4.44. The company encourages employees to work more environmentally friendly which secures second rank with mean score of 4.35. Organization following a formal or informal environment responsibility policy which secures third rank with a mean score of 4.27. The company allows their employees to work at home or telecommuting which secures fourth rank with a mean score of 4.19. The company encourages their employees / workers to participate / give suggestions on green suggestion scheme regarding green HR issues which secures fifth rank with a mean score of 3.22.

Table 3: Mean Value and SD Value of the Awareness level of Employees on Green HR Practices:

(SOURCE: COMPUTED FORM PRIMARY DATA)

Employee Awareness on	Mean Value	SD Value
Green HR Campaign	3.62	1.079
Recycling Program	3.99	0.896
Green Agenda	3.47	1.368
Energy Conservation	3.47	1.171
Automatic Shutoff	2.64	1.246

Management offering recycling programs for office products which is first with a mean score of 3.99. Conducting green HR campaign programs by an organization for its employees to provide awareness about green HR issues secures second rank with a mean score of 3.62. Job description in the corporate website of the company which supports green agenda ranked third with a mean score of 3.47. Energy saving efficient lighting systems and equipment which were used by the

management for energy conservation shares the third rank with green agenda. Automatic shutoff is used for equipment by the management for energy conservation has a mean score of 2.64. Analysis of Variance Analysis is done to find out whether there is any relationship between Age group of employees and their level of awareness regarding Green HR Practices. Green human resources make employees to promote sustainable practices and increase awareness among employees and their commitments on the issues of sustainability. For undertaking environment–friendly HR initiatives like better employee engagement, lower cost, reduction in carbon footprints etc. management should provide awareness programs among employees based on their age because employees outlook or perception regarding green HR practices may vary according to the age of employees.

Hypothesis for age and Employee awareness

H₀: All age group people have the same level of awareness on the green HR practices.

H₁: Level of awareness about green HR practices differs with age group.

Table 4: Difference between age and Employee awareness about Green HR Practices

Employee Awareness	Age in Years			F Value	P Value
	Below 25	26-35	36 and above		
	4.60 (1.278)	4.29 (0.935)	5.00 (0.867)	1.945	0.125

Since the P value is 0.125, Null hypothesis is accepted at 5% level. Hence it is concluded that, there is no significant difference between age and employee awareness regarding green HR practices. It is clearly stated that employees’ age has no influence on the awareness regarding green HR practices because employee awareness is stable and is extremely based on the information which they have gained.

Hypothesis for Gender and Employee awareness

H₀: Male and Female has the same level of awareness on the green HR practices practiced by the organization.

H₁: Male and Female has different level of awareness on the green HR practices practiced by the organization.

Table 5: Difference between Gender and Employee awareness about Green HR Practices

Employee Awareness	Gender		F Value	P Value
	Male	Female		
	5.32 (1.418)	3.859 (0.824)	1.482	0.175

Since the P value is 0.175, Null hypothesis is accepted at 5% level. Hence it is concluded that, there is no significant difference between gender and employee awareness regarding green HR practices. It is clearly stated that employees’ gender has no influence on the awareness regarding green HR practices because employee awareness is stable irrespective of whether they are male or female and is extremely based on the information which they have gained through their qualification.

Hypothesis for employee experience and E- Selection adopted

H₀: The feeling on E- Selection adopted by the organization for hiring employees does not differ with the employee experience.

H₁: The feeling on E- Selection adopted by the organization for hiring employees differs with the employee experience.

Table 6: Difference between Experience in Years and Electronic Selection Adopted

Electronic Selection Adopted	Experience in Years				F Value	P Value
	Below 2	2- 5 Years	6- 10 Years	Above 11 years		
	3.56 (1.456)	4.85 (0.985)	5.93 (0.854)	4.11 (0.756)	11.543	0.004

Since the p value is 0.004, null hypothesis is rejected at 5% level. Hence it is concluded that, there is a significant difference between experience of the employees and e-selection adopted for hiring. It is clearly stated that employees experience plays an essential role in recruitment.

8. Suggestions of the study

Green Employer:

Organization should recruit Green Employer: Organization should recruit green employer or employees who are aware about green environment and green HR practices. Management should recruit them at right time and at right place. By recruiting green employer, which may improve employer branding as well as staff motivation, employee engagement, increases workforce and reduces employee turnover.

Green Team:

Creating green teams among employees will helps to identify green issues and also it provides specific solutions for the problems, this makes organization to operate more

environmentally sustainable. Such teams will educate, inspire and empower employees regarding green environment and green issues.

Selection:

Management should adopt E- selection for hiring employees. It will reduce usage of carbon foot prints and also reduces cost & time. Management should conduct green orientation programs for newly hired employees; this will create environmental awareness among newly hired employees.

E- Performance Management:

For measuring environmental performance of employees organizations should use E-performance management system and E- HR system for tracking out carbon emission done by both management and employees.

Online Training Programs:

Management should provide online training and development programmes for employees regarding environmental and social issues such as waste management, elimination of plastics, creating green products, reducing carbon emission etc.

9. Conclusion

The green Human assets management has emerged from organizations engaging in practices associated with protection of surroundings and preserving ecological balance. Green HRM encompasses all activities geared toward supporting an agency perform its schedule for surroundings control to reduce its carbon footprint in regions worries on boarding and acquisition of human resources, their induction, performance appraisal & control, training and development and pay and reward management. Inexperienced HRM can play a beneficial position in enterprise in selling environment related issues by way of adopting and following inexperienced HR guidelines and moves. Green HRM can beautify company image and logo. Inexperienced HR will play an important role in making the employees aware of and worried for protection of natural assets and make contributions in pollutants manipulate, waste control and manufacture of green merchandise. The proposed technique model will assist the working towards managers and future researchers comply with green HRM strategies. the prevailing study also proposes destiny researchers to fill the space inside the existing literatures by way of accomplishing empirical studies consisting of inexperienced HRM practices within the production or service agencies (mainly the agencies that

are polluting surroundings, evaluating green HRM practices among evolved and growing nations, inexperienced perceptions, attitudes of agency and personnel, boundaries within the inexperienced HRM implementation etc. the present look at has made an strive to investigate the notion of employees about the green HRM tasks carried out via the respective businesses. it's been determined that, agencies have been imposing some of inexperienced HRM tasks. But, more severe method desires to be taken to implement them, communicate them to the employees, encourage employees to stick to such initiatives, and praise them, accurately. Additionally, it's miles vital to include the inexperienced HRM coverage into diverse HRM capabilities, such as, recruitment, induction, education, and so forth. The study also indicates that, employee involvement and participation could play a pivotal role in promoting inexperienced HRM enhancing organizational environmental performance by using focusing on waste control, recycling, maintaining fitness and protection standards, enforcing getting to know from education modules, and selling surroundings friendly organizational culture. Doing so, companies would not directly add fee to their corporate branding, thereby paving the manner for a purifier, more secure, and extra green working surroundings for the personnel and the employer stakeholders. It's far essential to remember the fact that, extra studies need to be carried out to become aware of the world precise environment-control problems. Additionally, there may be a scope for similarly studies to analyze the impact of inexperienced HRM on organizational overall performance. However, the existing take a look at has been capable of become aware of a number of troubles in regard to implementation of green HRM, at workplace in the steel industries located in Chhattisgarh.

Ranking techniques and applicant choice for employment roles within Human Resources include very high levels of uncertainty. This's because of the necessity to permit the different tastes as well as views of the various occupation domain specialists in the decision making process. Hence, there's a need to create a unit which is going to enable Human Resource departments to ascertain the most crucial needs criteria for a certain work, based on the personal preferences of various professionals, while making certain the expert's choices are impartial and properly weighted based on their expertise and knowledge. This can allow a far more effective method to list that is brief submitted candidate resume from a lot of candidates providing a fair and consistent resume ranking policy that is usually legally justified. This particular paper provides a Neuro Fuzzy style based method for identifying the primary key ability attributes determining each expert's preferences and ranking choices, while managing the concerns as well as inconsistencies in team choices of a panel of professionals. The presented item classifies the processes of needs specification as well as applicant's ranking. Tests are done to the taken service market industry in

which the proposed model is proven to create ranking choices which were fairly extremely consistent with those of the man professionals.

REFERENCES

1. Brockett, J., “Change agents people management”, 1-19, 23rd November 2006.
2. Renwick, D., Redman, T., & Maquire, S., “Green HRM: a review, process model and research agenda, Discussion Paper Series”, University of Sheffield Management School, The University of Sheffield, 1-45, 2008.
3. Smith, E. E., & Perks, S., “A perceptual study of the impact of green practice implementation on the business functions”, *Southern African Business Review*, 14(3), 1-29, 2008.
4. Jacob Cherian and Jolly Jacob, “A study of Green HR Practices and Its Effective Implementation in the Organization”, *International Journal of Business and Managemnt*, 7 (21), 2012.
5. Mandip, “Green HRM: People Management Commitment to Environmental Sustainability”, *Research Journal Recent Science*, 1, 244–252, 2012.
6. Li Ma, Maolin Ye, “The Role of Electronic Human Resource Management in contemporary Human Resource management”, *Open Journal of Social Sciences*, 71-78, 2015.
7. Prof. Ravi Prasad, “Green HRM - Partner in sustainable competitive Growth”, *Apeejay-Journal of Management science and Technology*, 15-18, 2015.
8. Somaye Nazari, Mir Ali Sayyed Naghavi, “A study of Electronics Human Resource Management at the Central Bank and Effectiveness of Human Resources management System”, *European Journal of Research and Mangement*, 290-299, 2015.
9. Camarinha-Matos, L. M., Afsarmanesh, H., Galeano, N., & Molina, A. “Collaborative networked organizations–Concepts and practice in manufacturing enterprises”. *Computers & Industrial Engineering*, 57(1), 46-60, 2009.
10. De Winne, S., & Sels, L. “Interrelationships between human capital, HRM and innovation in Belgian start-ups aiming at an innovation strategy”. *The International Journal of Human Resource Management*, 21(11), 1863-1883, 2010.
11. Vachtsevanos, G. J., Kim, S. S., Echauz, J. R., & Ramani, V.K. “Neuro-fuzzy approaches to decision making: A comparative study with an application to check authorization”. *Journal of Intelligent & Fuzzy Systems*, 6(2), 259-278, 1998.
12. Fortemps, P. “Fuzzy sets for modeling and handling imprecision and flexibility”. *Faculté Polytechnique De Mons dissertation*, Belgium.
13. Shahhosseini, V. & Sebt, M. H. “Competency-based selection and assignment of human resources to construction projects”. *ScientiaIranica*, 18(2), 163-180, 2011.

14. Jang, J. S., & Sun, C. T. “Neuro-fuzzy modeling and control”. Proceedings of the IEEE, 83(3), 378-406, 1995.
15. McCauley-Bell, P., & Badiru, A. B. “Fuzzy modeling and analytic hierarchy processing to quantify risk levels associated with occupational injuries”. I. The development of fuzzy-linguistic risk levels. IEEE Transactions on Fuzzy Systems, 4(2), 124-131, 1996.
16. Chou, T. Y., Seng-cho, T. C., & Tzeng, G. H. “Evaluating IT/IS investments: A fuzzy multi-criteria decision model approach”. European Journal of Operational Research, 173(3), 1026-1046, 2006.
17. Ashrafi, M., Chua, L. H., & Quek, C. “The applicability of Generic Self-Evolving Takagi-Sugeno-Kang neuro-fuzzy model in modeling rainfall–runoff and river routing”. Hydrology Research, 50(4), 991-1001, 2019.
18. Bemani-N, A., & Akbarzadeh-T, M. R. “A hybrid adaptive granular approach to Takagi–Sugeno–Kang fuzzy rule discovery”. Applied Soft Computing, 81, 105491, 2019.
19. Parmar, K. S., Makkhan, S. J. S., & Kaushal, S. “Neuro-fuzzy-wavelet hybrid approach to estimate the future trends of river water quality”. Neural Computing and Applications, 31(12), 8463-8473, 2019.
20. Saqib Shamim, Shuang Cang, Hongnian Yu, and Yun Li, Eds.,”Management approaches for Industry 4.0”: A human resource management perspective: IEEE, 2016.