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**Title**

**FAILURE MODEL OF PEOPLEWARE  
FACTORS: A NEURO-COMPUTING  
APPROACH**

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**Abstract:**

Human Resource can play a critical role in the success and failure of Information systems in an organization. It has been established that even the best of Information systems do fail due to the neglect of the human factor. According to OASIG Report [1], 80-90% IT projects do fail mainly due to neglect of human factor. Therefore, in this paper an attempt has been made to propose an Artificial Neural Network(ANN) based approach that help us to study the failure/success of the Industry due to Peopeware(Human Resource) for an Information system. The study is particularly important because most of the studies make use of conventional approaches having their own limitations such as following an algorithmic approach. The ANNs do not suffer from such limitations and they process information in a similar way the human brain does. Neural networks learn by example. Thus this approach is likely to provide better results as it is done using the MATLAB R2007B programming by Neural Network programs. Hence, such a study will be of great importance with respect to the Indian Industry.

**Keywords-** Neural Networks, Human resource factors, Company success and failure factors.

**Introduction:**

Achieving the Information system success is the critical issue for many organizations. Prediction of a company's success or failure is largely influenced by human resource (HR). Appropriate utilization of resources is a major challenge in achieving business goals. It has been well established in research literature that emphasizing these HR factors may lead to success of company and their underutilization may lead to its failure.

In most of the organizations management makes use of conventional Information system (IS) for predicting the utilization of their human resources. In this paper efforts have been made to understand and suggest HR factors leading to success or failure of a company based on Artificial Neural Networks (ANN). It is particularly important as the neural networks have proved their potential in several fields. Millan [2], G. Bellandi, R. Dulmin and V. Mininno [3], Sharma, A. K., Sharma, R. K., Kasana [4],[5]. India has distinguished IT strength in global scenario and using technologies like Neural Networks is extremely important due to their human brain.

.In this paper a Neuro-Computing approach has been proposed with some metrics collected through pre acquisition step from the communication industry. In this study, a connectionist approach is proposed to predict success or failure of company. The back-propagation learning algorithm based on gradient descent method with adaptive learning mechanism has been used. The configuration of the connectionist approach has been designed empirically. To this effect, several architectural parameters such as data pre-processing, data partitioning scheme, number of hidden layers, number of neurons in each hidden layer, transfer functions, learning rate, epochs and error goal have been empirically explored to reach an optimum connectionist network.

### **Review of literature:**

The review of IS literature suggests that for the past 15 years, the success and the failure factors of human resource in Information systems have been major concerns for the academics, practitioners, business consultants and research organizations.

A number of researchers and organizations throughout the world have been studying that why Information systems may fail? Jay Liebowitz, [6]. Flowers, S [7] at the Centre for Management Development at the University of Brighton, UK, identifies the following critical IS failure factors:

- Fear-based culture.
- Poor reporting structures
- Over commitment.
- Political pressures.
- Technology focused.
- Leading edge sys
- Complexity underestimated
- Poor training.
- Technical fix sought.
- Poor consultation.
- Changing requirements.
- Weak procurement.
- Development sites split.
- Project timetable slippage.
- Inadequate testing.

Delone and Mclean [8], surveyed 285 articles and proposed six major dimensions of IS viz. superior quality (the measure of IT itself), information quality (the measure of information

quality), information use (recipient consumption of IS output), user satisfaction (recipient response to use of IS output), individual impact (the impact of information on the behavior of the recipient) and organizational impact (the impact of information on organizational performance).

All the studies predict that during the past two decades, investment in Information technology and Information system have increased significantly in the private and public sector organization. But the rate of failure remains quite high.

In general, remedial action on which most of the researchers seem to be agreeing is the need of the study of failures of Information system due to human resource.

### **Research methodology:**

The study comprises of survey of employees of two companies one successful and other failure one. With this aim, two prestigious companies (first one is Reliance Communications, Chandigarh and the other one is Puncom, Mohali) have been considered in this study. One of them is a successful company and other one failure. 109 managers belonging to these companies have been included in the study. Thus the primary data collected has been analyzed using Neuro Computing approach of MatLab2007a and to reach the conclusion. Through this study, the communication sector companies will be in better position to know most important HR factor that may lead to the success or failure of it. Hence the companies may put their efforts to achieve it. This will facilitate the IS management and IS developers. Bruce Curry and Luiz Moutinho,[9]; Wei-Min Ma<sup>1, 2</sup>, Xiu-Juan Ma<sup>1</sup>. [10]. The IS's application layers in enterprises is a multi-layer index system having operational layer, tactical layer and strategic layer, from bottom to top as shown in figure 1. Hare Krishana [11].

The rest of the paper is organized as follows:



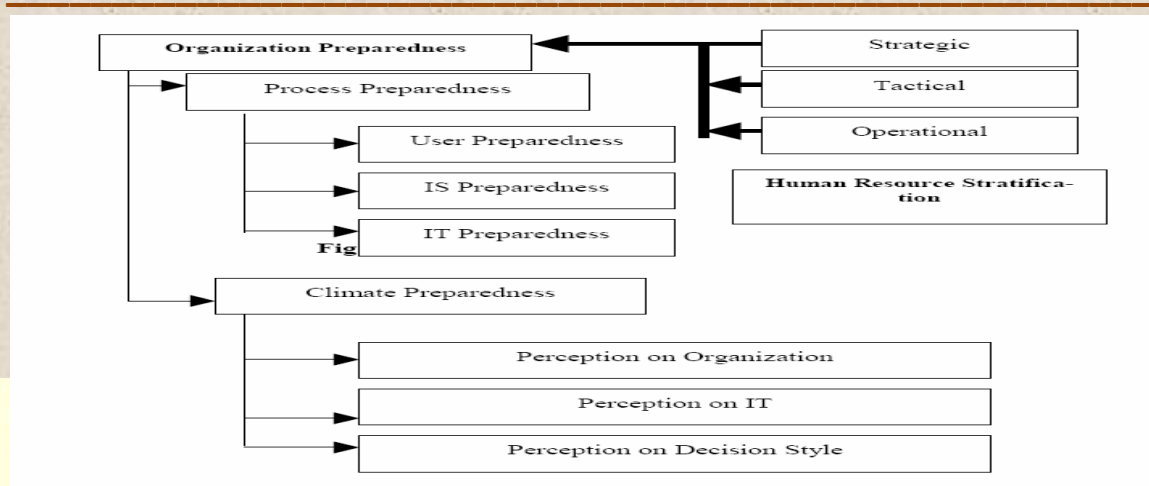


Figure 1: The Systemic Link

### Hr model:

Human resource is a critical function in an organization aimed at managing human capital so that organization could fulfill its objectives. Human resource management in an organization deals with basic expert functions of HR planning, selection, recruiting, staffing, training and development etc.

Human resource development (HRD) is a process in which the employees of an organization are continually helped in a planned way to

- i) Acquire or sharpen capabilities required to perform various functions associated with their present or expected future roles.
- ii) It is a way to better adjust the individual to his job and the environment.
- iii) The greatest concern to enhancing the capabilities of an individual.
- iv) Develop an organizational culture in which superior-subordinate relationship and collaboration among sub units are strong and contribute towards the professional well-being motivation of employees.

The technique used to evaluate the HR factors taking into considerations of all the above HR factors for both the organizations is the questionnaires.



### **Applying Artificial Neural Networks:**

An ANN is configured for this specific application. In this application the HR factor is merged with IS.HR factors when are processed by neural networks are more efficient than statistical methods because latter is concerned with input data and does not consider any pattern while formal is like human brain, as we think and analyse similarly neural network model do so. There are number of HR factors with each having one appropriate rank out of five on Liker scale. Neural network model will be developed to recognise teaching pattern of HR factors. Survey will act as input to model. The hidden layer in neural network model will determine the pattern. The model will be trained using ANN tool. The data which is used while training have predefined output. So when sample data is introduced during simulation, predefined data used for training will act as base for target data.

The network has been trained with the predefined outputs, so it will compare the inputted values with the predefined outputs without any biasing and with the greatest precision which cannot be fully attained via conventional method. As the Neural Networks are trained and intelligent machines, so it can easily provide the training to others without any exertion and confusion continuously and repeatedly.

### **Experiment result and discussion:**

The investigations have been carried out on the data obtained from telecommunication sector industry. This industry comprises of Reliance Communication, Vodafone, Essar, Idea, and Bharti-Airtel. But the data is undertaken at Reliance Communication, Chandigarh and Punjab Communication Ltd. (Puncom) Mohali. The specific choice has been made because:

- The Telecom sector is very dynamic and fast growing. India is the second largest country of the world in mobile usage.
- The first industry is the early adopters of IT and has by now, gained a lot of growth and experience in IS development and whereas the other one lag behind and leads to its failure.

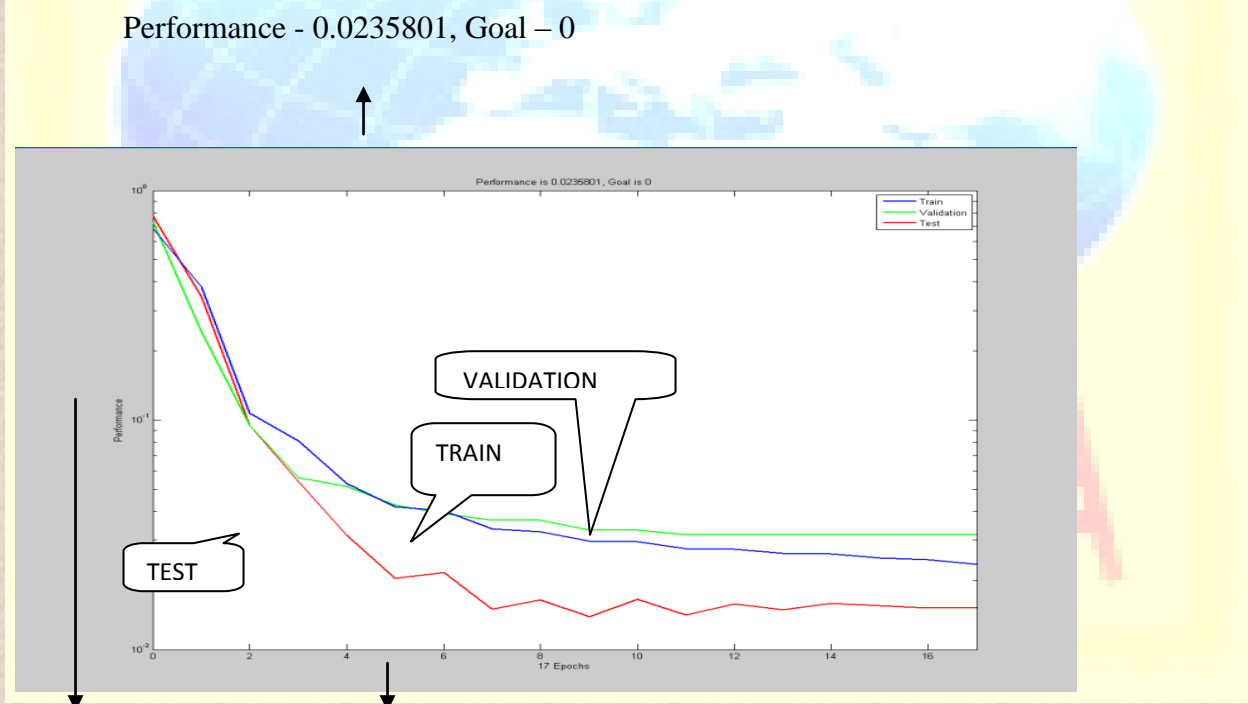
One industry is considered for the study because of the fact that the working constraints of various organizations under one industry are similar and hence adds to the reliability of the

study finding. The input and output variables, considered in the study, include strategic parameter(x1), tactical parameter (x2), operational parameter (x3), employee outcome (y). The dataset comprises of 200 patterns:

The performance of the model developed in this study is evaluated in terms of mean square error (MSE). The mean square error indicates the accuracy for the failure company which comes out to be 100%...The experimental results of simulation of data of Failure Company is summarized in Graph I.

The results of the simulation are in the form of graphs of performance of system v/s epochs done by coding in the MatlabR2007B.

The 1<sup>st</sup> iteration shows the output of the system with 1-hidden layer feed forward network with 10 neurons in the hidden layer.



Performance 17 Epochs

Graph 1: For 1<sup>st</sup> iteration with 1 hidden layer & 10 neuron

TRAINLM-calcjx, Epoch 0/100, MSE 0.683164/0, Gradient 0.808662/1e-010

TRAINLM-calcjx, Epoch 17/100, MSE 0.0235801/0, Gradient 0.0163509/1e-010

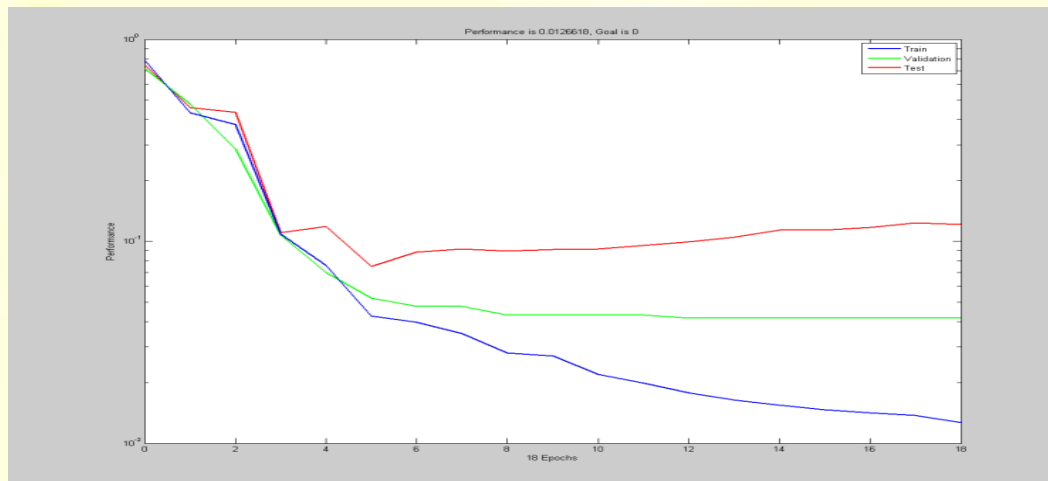
TRAINLM, Validation stop.

Total testing samples: 40

Percentage Correct identification : 100.000000%

Percentage Incorrect identification: 0.000000%

The 2nd iteration shows the output of the system with 1-hidden layer feed forward network with 11 neurons in the hidden layer



Graph 2: For 2<sup>nd</sup> iteration with 1 hidden layer & 11 neuron

TRAINLM-calcjx, Epoch 0/100, MSE 0.786652/0, Gradient 1.05701/1e-010

TRAINLM-calcjx, Epoch 18/100, MSE 0.0126618/0, Gradient 0.0123547/1e-010

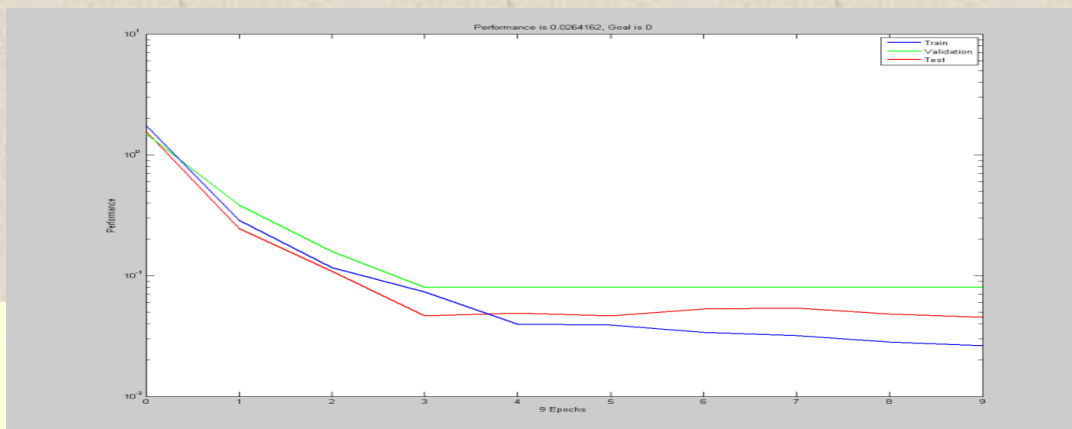
TRAINLM, Validation stop.

Total testing samples: 40

In this 3<sup>rd</sup> to 14<sup>th</sup> iteration were tried for the increment of one more neuron .But the best result is by this 15<sup>th</sup> iteration showing below in Graph 3

The 15<sup>th</sup> iteration shows the output of the system with 1-hidden layer feed forward network with 14 neurons in the hidden layer





Graph 3: For 15<sup>th</sup> iteration with 1 hidden layer & 14neuron

TRAINLM-calcjx, Epoch 0/100, MSE 1.74063/0, Gradient 2.71404/1e-010

TRAINLM-calcjx, Epoch 9/100, MSE 0.0264162/0, Gradient 0.0182176/1e-010

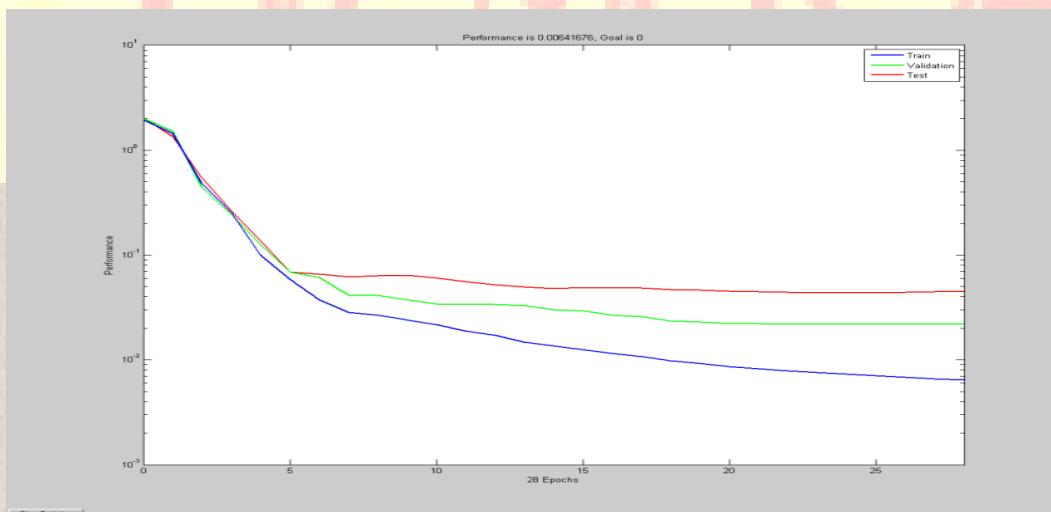
TRAINLM, Validation stop.

Total testing samples: 40

Percentage Correct identification : 100.000000%

Percentage Incorrect identification: 0.000000%

The 16<sup>th</sup> iteration shows the output of the system with 1-hidden layer feed forward network with 15 neurons in the hidden layer



Graph 4 : For 16<sup>th</sup> iteration with 1 hidden layer & 15neuron

TRAINLM-calcjx, Epoch 0/100, MSE 1.92923/0, Gradient 2.86712/1e-010

TRAINLM-calcjx, Epoch 25/100, MSE 0.00705224/0, Gradient 0.00542461/1e-010

TRAINLM-calcjx, Epoch 28/100, MSE 0.00641676/0, Gradient 0.00365777/1e-010

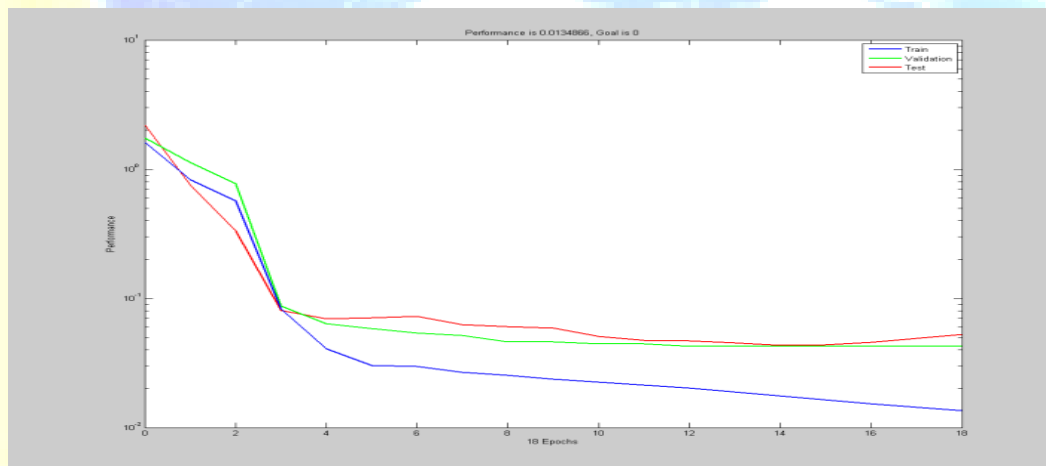
TRAINLM, Validation stop.

Total testing samples: 40

Percentage Correct identification : 95.000000%

Percentage Incorrect identification: 5.000000%

The 17<sup>th</sup> iteration shows the output of the system with 1-hidden layer feed forward network with 16 neurons in the hidden layer.



Graph 5: For 16<sup>th</sup> iteration with 1 hidden layer & 15 neuron

TRAINLM-calcjx, Epoch 0/100, MSE 1.60728/0, Gradient 2.6478/1e-010

TRAINLM-calcjx, Epoch 18/100, MSE 0.0134866/0, Gradient 0.0146145/1e-010

TRAINLM, Validation stop.

Total testing samples: 40

Percentage Correct identification : 95.000000%

Percentage Incorrect identification: 5.000000%

In this way other iterations have been tried by 1-hidden layer feed forward network with 12 to 18 neurons in the hidden layer.

But it has been found that the output of the system with 1-hidden layer feed forward network with 14 neurons in the hidden layer gives the best results in predicting the success or failure of IT Industry due to human factor.

### **Conclusion:**

HR factors have strong influence over company success and failure. Earlier HR factors were measured through variance estimation but latter came statistical software's. Today with the invent of expertise technologies neural network can be used to replace the existing statistical models. Neural network will have edge over existing approach due to their learning power and self organising technique. The computing world has a lot to gain from neural networks. Their ability to learn by example makes them very flexible and powerful. Furthermore there is no need to devise an algorithm in order to perform a specific task; i.e. there is no need to understand the internal mechanisms of that task. They are also very well suited for real time systems because of their fast response and computational times which are due to their parallel architecture.

The more use human get out of the machines the less work is required by him. In turn less injuries and stress to human beings.

In this approach, the connectionist model on the basis of hit and trial has selected the network which has 99.09% accuracy for predicting the failure of the company as shown in table-1 of simulation results where as the coding done for the Neural Network gives 100% accuracy.

So, in a nutshell as the stress gets reduced the performance is automatically uplifted. Human beings are a species that learn by trying, and we must be prepared to give neural network a chance seeing AI as a blessing, not an inhibition.



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