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CLASSIFICATION OF EMPLOYEE TURNOVER INTENTION USING HIERARCHICAL CLUSTER ANALYSIS: A CASE STUDY FROM INDIAN PHARMACEUTICAL COMPANIES

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ABSTRACT: The aim of this paper is to study the employee turnover ratio in an Indian pharmaceutical company in India. Primary data were collected from 50 employees of two pharmaceutical companies using questionnaire methods. The questionnaire data was grouped to produce a concise representation of the human resource turnover retention using hierarchical clustering (HC) technique. The results of HC have grouped the numerical questionnaire data into two groups named as push and pull factors. It is observed that the mean of the pull factors was higher owing to higher turnover intention of the employees. Hence, it is recommended to the organization to include these factors to be part of the organization business strategy rather than being left to HR managers to act in order to reduce the employee exits from the organization.

INTRODUCTION: Employee's turnover is a well-recognized issue of critical importance to the organizations. Employee turnover is a well-recognized issue of critical importance to the organizations. Lack of employee's continuity involves high cost in the induction and training of new staff. In a recent study, best practices found that the annual turnover of employees for the pharmaceutical industry in India is 14.2%, particularly the sales people's turnover is very problematic in large pharmaceutical companies [1]. This has therefore created a wide knowledge gap on staff turnover management and hence created a need to conduct a study on factors contributing to employee turnover in pharmaceutical companies in India.

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The available literature indicated various factors that why employees quit job under different domain industries. There is also much discussion on the relationship between various factors and turnover. The relationship between job satisfaction and turnover was studied by [2]. The relationship between organization commitment and turnover was worked on by [3]. Another relationship between work satisfaction, stress and turnover in the Singapore workplace was conducted [4]. A study on the relationship between adverse working condition and turnover is carried [5].

A study in Pakistan to fund the relationship between job satisfaction, organizational commitment, perceived alternative job opportunities and turnover intention was carried out [6]. The relationship between supervisor and employee attitude in their study was demonstrated [7]. A research was conducted in China to show the relationship between job satisfaction, organizational commitment or career commitment [8]. They also proposed that employee turnover should not be left to be handled by HR department alone rather it

should be looked at as part of the overall business strategy since human capital is one of the major factors of production. The factors affecting employee turnover were studied from various literature papers and was used for the design of the questionnaire instrument in our study.

A questionnaire based on respondents answer through the implementation of soft computing methods and further better clustering of choices and segmentation has been accomplished[9]. Thus it is observed from the literature that there are comprehensive papers on the study of employee turnover intention and a very few papers on clustering of questionnaire data has been studied. But, the integration of clustering techniques to classify the questionnaire data for employee retention is not reported in the literature. Hence, this research has accomplished to fulfill the research gap.

The manuscript is organized into the following sections: After introduction and review of literature in section 1, Section 2 illustrates research methodology used in our work. Result and discussion is carried out in section 3. Paper is concluded in section 4.

RESEARCH METHODOLOGY: The study focused on pharmaceutical industry in India which is the target population on which the findings were generalized to. Data collection was through a questionnaire that was interviewer administered. The study population was employees of Zyris Derma Care Pvt. Ltd., Chennai and Dr. Suris Life Sciences Pvt. Ltd., Chennai. A pilot study was conducted to test the reliability of the instrument (questionnaire). This involved selecting 2 respondents from each strata and issuing them with the questionnaires.

Data was obtained using the questionnaires and after evaluating and identifying the response, reliability analysis using Kunder Richardson 20 formulae was conducted. The results were applied to modify or drop the items whose thresholds were low. Data reliability also plays an important role towards generalization of the gathered data to reflect the research objective.

Descriptive statistics data analysis method was applied to analyze quantitative data where data was scored by calculating the percentages and means.

The statistical package for social sciences (SPSS) computer software was used the purpose of analyzing the quantitative data. The mean values of every question from all the samples were used to identify the natural groupings to produce a concise representation of the systems behavior. Hierarchical Clustering was deployed as the data clustering technique. It provides a method that shows how to group data points that populate some multidimensional space into specific number of different clusters.

Thus, our research framework embeds data mining techniques like cluster analysis to group concise representation of the questionnaire analyzed data. This methodology has not been proposed in the literature so far as per the author's understanding.

RESULTS AND DISCUSSIONS: The response rate of the employees who wish to resign from both the organizations considered for the study was around 80% and the respondents demographic profile were within the age group of 31-40 years (52%), followed by the age group of 18-30 years (22%), 41-50 years age group constituted 14% and the last group of 41-50 years was the minority respondents constituting 12%. The summary of the work experience in current organization is grouped and shown in **Fig. 1**.

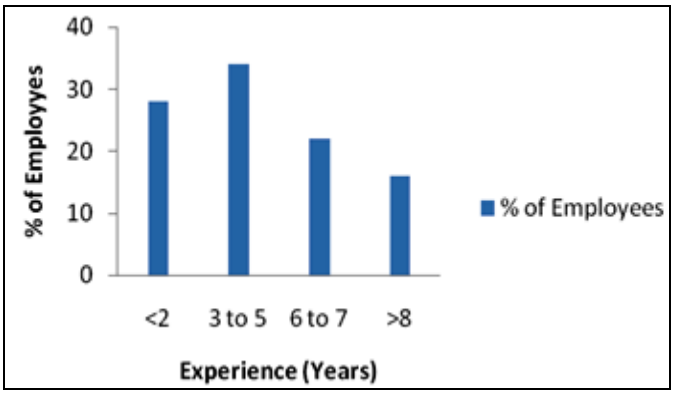

FIG. 1: SUMMARY OF WORK EXPERIENCE

Using Likert scale method rating; 5-Strongly agree, 4-Agree, 3-Neither agree nor disagree, 2- Disagree, 1-Strongly disagree, the employees who wish to resign were asked to evaluate the questionnaire and the mean of values for every question index (QI) given in **Table 1**. This means values are given as inputs to the hierarchical cluster analysis. This is the major statistical method for finding relatively homogeneous clusters of cases based on measured characteristics.

It starts with each case as a separate cluster, i.e. there are as many clusters as cases, and then combines the clusters sequentially, reducing the number of clusters at each step until only one cluster is left. The clustering method uses the dissimilarities or distances between objects when forming the clusters. The SPSS program calculates 'distances' between data points in terms of the specified variables.

TABLE 1: QUESTIONNAIRE – MAIN FACTORS THAT INTENDS EMPLOYEE TO SWITCH JOB

Gender :
Age (Years):
Marital status:
Highest level of education: Bachelors/ Masters/ Doctorate
Total experience:
Experience in current organization:
Your present position:

QI	Question	Mean
1	Health reasons	3.1
2	Family related problems	3.8
3	Pursuance of higher education	3.2
4	Organizational timing, rules and regulations	2.3
5	Expectation of a high salary	4.3
6	Expectation of a Promotion	3.7
7	Availability of more research facilities	3.3
8	Job security	3.1
9	Financial benefits	3.1
10	Reputation of organization	3.7
11	Fairness in the organization	3.4
12	Location of the organization	3.2
13	Working environment	3.1
14	Behavior of boss	2.6
15	Conflict among employees	2.2
16	Motivation and encouragement for good work	3.2
17	Size of the organization	3.1
18	Because of fun	1.8
19	Difficulty of job	2.2
20	Social status	1.9

Given a set of N items to be clustered, and an NxN distance (or similarity) matrix, the basic process of Johnson's (1967) hierarchical clustering has been implemented and the results are given in **Table 2a through 2c** respectively.

TABLE 2A: INITIAL CLUSTER CENTERS

	Cluster	
	1	2
MEAN	1.80	4.30

TABLE 2B: CLUSTER MEMBERSHIP

QI	Cluster	Distance
Q1	2	1.200
Q2	2	.700
Q3	2	1.100
Q4	1	.500
Q5	1	.000
Q6	1	.600
Q7	1	1.000
Q8	1	1.100
Q9	1	1.200
Q10	1	.600
Q11	1	.900
Q12	1	1.100
Q13	1	1.200
Q14	2	.800
Q15	2	.400
Q16	2	.400
Q17	2	1.200
Q18	2	.000
Q19	2	.400
Q20	2	.100

TABLE 2C: FINAL CLUSTER CENTERS

	Cluster	
	Pull	Push
MEAN	3.3	2.61

Out of the 20 questions considered for the study, the hierarchical cluster analysis has classified 10 questions into cluster 1 and the remaining 10 questions into cluster 2. When cluster memberships are significantly different they can be used as a new grouping variable in other analyses.

Cluster 1 is characterized as the "Pull cluster", where in the employees are attracted to a new place of work. They are also called as uncontrolled factors because it is out of control of the organization. The various pull factors identified from our case study are: Organizational timing, rules and regulations, expectation of a high salary, expectation of a promotion, availability of more research facilities, job security, financial benefits, reputation of organization, fairness in the organization, location of organization and its work environment.

Cluster 2 is characterized as the "Push cluster", where in employees are pushed towards the exit door. It is also called as controlled factors, since it can be controlled by organizations.

The various push factors identified in our case study are: Health reasons (Personal), family problems, pursuance of higher education, behavior of boss, conflict of employees, motivation and encouragement of good work, size of the organization, difficulty of job and social status.

Among the pull factors, expectation of a high salary, expectation of promotion and reputation of the organization (to be switched) is the most significant reasons for which the employees quit. Among the push factors, family related problems were the most significant push factor contributing to employee exit.

CONCLUSION: The factors of turnover intention are different from organization to organization to some extent. In this paper, all factors were divided into two clusters using hierarchical clustering technique namely push and pull factors. This paper concludes that the most significant factor is pull factor with a mean value of 3.3.

The push factor also contributes to the turnover with a mean value of 2.61, but not significantly. Thus, the study recommends to the organization that, if efforts are put by the organization to improve employee retention, the causes of push factors may be reduced to a great extent.

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