

Employee Segmentation by Measuring the Attitude of ‘Intention to Stay’: A Machine Learning Approach

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Abstract: This study aims to segment the employees based on their attitude towards more extended stay in the organization. Employees' attitude differs despite having an elite HR system and administration. However, identifying the factors that influence the employees' attitude towards their stay is crucial to retaining them. Hence, this study measures their attitudes regarding working conditions, supervision, compensation and benefits, task assignments, amenities, grievance handling system, and other HR operating factors. As a result, this study uncovers the position of employees into different segments based on this measurement task. The samples are drawn from the shop-floor and operation level of employees working in a textile company with more than 500 crores as annual turnover.

Key Words: Attrition, Retention, Intention to Stay, Cluster Analysis, Employee Segmentation

• CCS Concepts: Human-centered computing

Introduction and Background of the Study

Much more research has been conducted to study the employees' intention to leave the organization as attrition becomes a headache of any HR system (Mansurali A et al., 2020). But, only a few studies have covered what influences employees to stay in the organization (Kalliath & Beck, 2001; Saks, 1996). Though the results of both these views look similar, the attitude differs when the perception changes. The employees sometimes tend to see the organization from a labour market perspective, resulting in either toleration or intolerance. The perpetual process is not the same when questions are asked from two extremes. Hence, a study is required to probe what made employees stay longer than the question of leaving the organization (Dileep & Normala, 2014).

This study has been conducted predominantly to provide an opportunity for the faculty member to expose to real-time consultancy assignments in the industry. Initially, the author has approached the Management of Firebird Institute of Research in Management and Shiva Texyarn Limited, Coimbatore, for sponsoring this project and facilitating the faculty member. This study also supports the Management's expectation of grouping their shop-floor employees to respond to their prevailing attrition phenomena.

Literature Review

The concept of employee turnover has been researched since the 1980s to address the issue of attrition and retention of talents (Cotton J L & Tuttle J M, 1986). Yet, defining the concept of employee turnover is not so easy as it varies depending on the industry. The researchers who have studied the attrition phenomena in the service industry identified several factors influencing it. Nevertheless, looking at the same phenomena in the manufacturing industry is crucial (Decker et al., 2003; Fields, 2005; Davidson, 2006). The author has identified a handful of essential factors to study the employees' intention to stay in this study.

According to Watkins (1953), employee turnover is an inflow and outflow of employees into the workforce of an organization for a particular

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period. It is evident that many variables determine the outpouring of employees from the talent pool, such as labour market fluctuations, the status of casual labourers, and other internal environment-related factors of an organization. However, it would be interesting for a behavioural scientist to study the employees' psychological state regarding the organization's internal environment, such as job satisfaction (Mobely, 1997), job attitude (Colquitt et al., 2005), relationship with peers (Ferreira, 2007), relationship with the supervisor (Micheal, 2008), team synergy, team dynamics, grievance handling (Ichiowski, 1986), Socialization (Maanen & Schein, 2979), Career Development (Hellesey et al., 1985), perception towards monetary and non-monitory benefits (Boudreau et al., 1997), workload (French & Caplan, 1972), rules and regulations (Quinn, 1773), shift timings (Costa, 1996), Location (Masahu, 2008), condition of Ergonomics (Jeffress, 2013), etc. Based on this psychological perspective, the author has considered some of these significant factors to study the employees' intention to stay.

According to Rozsa Z, Foremanek I, Manak R (2019), one should not stop with the task of measuring the employees' attitude of intention to stay or leave but should connect the same with segmenting employees and consider for other HR decision-making. These authors applied logistic regression in their study and classified the employees into risk and no risk categories. However, binary classification is not the only option, but other classification techniques are also available to segment the employees into more than two categories. Two-step Cluster analysis and other clustering methods can also serve the purpose of segmentation of employees. Hence, the above discussions and claims form the objective of this study.

Objectives of the Study

From the review discussed in the literature review section, it is realized that studying employees' intention to stay is inevitable if one wants to understand the attrition phenomena and the retention model required for the organization (Watkins, 1953). But the contextualizing makes it different from the existing studies. Though many studies have been conducted in the manufacturing sector, little emphasis is given to the rural spinning industry (Sujatha R et al, 2023). It is also viable for the researcher to complete his study in the spinning industry because of his affiliation. Hence, measuring

the employees' intention to stay based on the significant factors (Dileep & Normala, 2014) and connecting them with the employee segmentation form the primary objectives of this study as listed below.

1. To identify the significant factors influencing the employees' attitude of 'intention to stay'.
2. To segment the employees based on the significant factors influencing the employees' attitude of 'intention to stay'.

Research Methodology

Ideally, this study has been raised as part (20%) of the researcher's consultancy project at a textile company in Coimbatore, Tamil Nadu. Hence, this is applied research. However, the methodology was developed based on the context and availability of time, skills, tools, etc. Primarily this study is built on the exploratory design where the established questionnaire is used to measure the employees' attitude of 'Intention to Stay'. The researcher has borrowed the 'Intention to Stay' scale developed by Dileep Kumar and Normala S Govindaraja (Xiamen University, Malaysia). There are 22 factors considered from this scale, along with demographic and career-related questions.

Though this study involves an established scale as a quantitative instrument, a qualitative approach was used to convince that the scale is appropriate. There were eight supervisory (middle) level employees, and three higher level (Top Management) administrators were (in-depth) interviewed. These results led to a Focus Group Discussion conducted among the shop-floor level employees later. Finally, the variables were sorted to pick the appropriate scale to collect the quantitative data. The researcher has chosen the 'Intention to Stay' Scale, out of a few hand-picked scales, as this scale's factors match with the variables sorted from the qualitative study.

For the final data collection, a simple random sampling was used by picking the shop-floor level employees from the random shifts. Hence, the data was collected from 1890 employees out of 3500 in the selected unit. However, the researcher has not much control over choosing the samples as the HR Department made the selection. Hence, this may form a significant limitation of this study.

Data Analysis

The collected data were analyzed using appropriate statistical tools in line with the objectives of the study. Initially, Frequency distribution and descriptive analyses like Mean and Standard Deviation were used to understand the nature of the data. Secondly, the Exploratory Factor Analysis was used to identify the significant factors influencing the employees' Intention to Stay. Next, the Cluster Analysis (Anifa, M., et Al., 2022) was used to segment the employees based on the significant factors influencing their intention to stay.

Factors influencing "Intention to Stay":

Reliability is the evidence of internal consistency on any scale. Hence, the reliability of the scale - "Intention to Stay" was tested using SPSS. The Cronbach alpha of this 22-item scale was 0.851, which is considered enough to explain the scale's internal consistency. Next, an exploratory factor analysis technique was used to find the dimensions of the construct to achieve the first objective of this study. The Kaiser-Meyer-Olkin measure was considered to check the sample adequacy. According to Kaiser's suggestion, the KMO value (.742) is acceptable (Babenko and Vitalina, 2018). Bartlett's test of sphericity is shown as significant at a 1% level of significance (<0.01). The total variance ($>65\%$) explained in Factor Analysis is also acceptable (Jyoti and Jeevan, 2015). Varimax Rotation was used to align the coordinates to get the best set of items into factors. As discussed in Table 1 (Appendices), the rotated component matrix resulted in seven factors. The author has labelled the factors based on the common attribute of the items that belong to a single factor. Working Conditions, Compensation and Benefits, Safety, Job elements, Socialization, Training and Support, and Physical balance are the seven factors extracted from the analysis.

Employee Segmentation based on "Intention to Stay":

The seven factors derived from the exploratory factor analysis are used as fuel to segment the employees in this stage. A two-step cluster analysis segmented the employees based on their "Intention to Stay" attitude. According to Kooiker and Marlou (2015), the cluster size ratio (1.15) is acceptable (Table 2 & Chart 1), whereas the software considers the Cluster quality as "FAIR" (Chart 2). Finally, the cluster was generated based

on the predictor importance, i.e. seven factors derived from the "Intention to Stay" scale (Chart 3). It is found that physical balance, working conditions, and Compensation and Benefits are the three most essential factors that divide the employees into two clusters. However, safety, job elements, and socialization moderately influence employee segmentation, whereas the training and support functions are considered at the least. The employees who fall in the first cluster mostly hold less than the average score on their attitude scale, whereas the other employees in the second cluster account for above-average scores on the same scale (Table 3).

Findings and Discussion

The exploratory factor analysis found that seven factors determine the employees' "Intention To stay" attitude out of those 22 items adopted from the "Intention To Stay", an instrument developed by Dileep Kumar and Normala (2014). The same factors decide the employee segmentation based on the two-step cluster analysis. The cluster analysis resulted in dividing employees into two clusters/groups. The portion of employees is in the risk category of quitting their job, while the other employees have to be considered an asset of the organization. Hence, the HR Manager may drill down by assessing the Risk category of employees and developing policies to engage these shop-floor-level resources. At the same time, the No-Risk category of employees shall be considered for the long-term engagement programmes and succession planning initiatives to retain them.

Conclusion

The attitude of the human being is not constant but can be managed by describing, diagnosing, and predicting their behaviour. At the outset, the HR Manager can manage the employees' attitude and behaviour to improve the individual and the organization's productivity and performance. This study makes evident that the employees' attitude of "Intention To Stay" can be studied and used as a basis for segmenting them. However, the researcher/practitioner should consider the context, business environment, resources, knowledge and skills to achieve the best results. Understanding the Management's perception of retaining the risk category of employees and developing a No-Risk type of employees shall be the scope for further research.

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2

Appendices:

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Table 1: Rotated Component Matrix

Rotated Component Matrix^a

	Component						
	1	2	3	4	5	6	7
Relationship with Supervisors	.803						
Supervision	.762						
Achievement Recognition	.561				.375	.346	
Location	.446		.372				
Working Condition	.445		.410				
Hostel Food		.751					
Terms and Conditions		.725					
Salary		.685					
Safety			.787				
Supportive Management			.700				
Grievance Redressal and Counselling			.653				.420
Working Hours / Shift				.819			
Ergonomics				.680			
Tasks and Responsibilities	.318			.580			.367
Work-Life Balance			.396	.527			
Hostel Life					.738		
Socialization		.317			.696		
Career Growth		.510			.544		
Training and Development						.811	
Relationship with Co-workers	.319					.652	
Health Facilities		.353					.740
Workload		.404		.363			-.595

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization. ^a

a. Rotation converged in 11 iterations.

Table 2: The Ratio of Cluster Sizes

Size of Smallest Cluster	879 (46.5%)
Size of Largest Cluster	1011 (53.5%)
The ratio of Sizes: Largest Cluster to Smallest Cluster	1.15

Cluster Sizes:

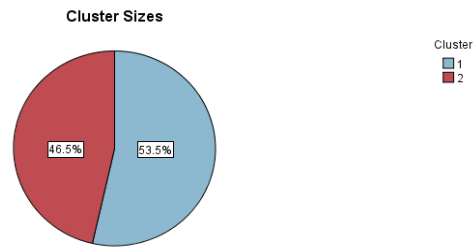


Chart 1 shows the Cluster Sizes

Model Summary and Cluster Quality:

Model Summary

Algorithm	TwoStep
Inputs	7
Clusters	2

Cluster Quality

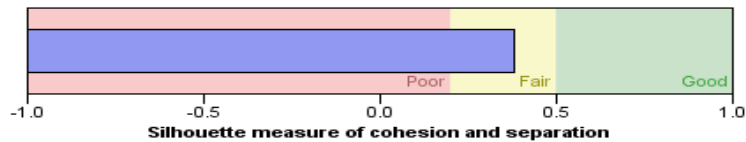


Chart 2 shows the Model Summary and Cluster Quality

Predictor Importance:

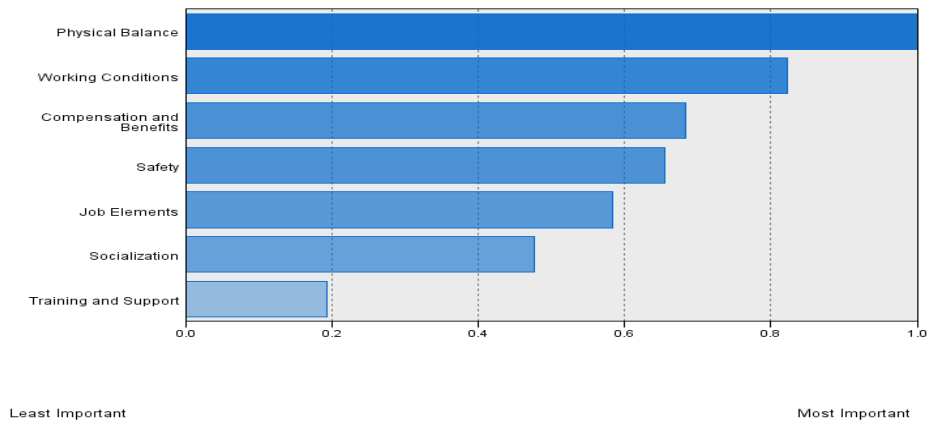


Chart 3 shows the Predictor Importance

Table 3: Cluster Scores

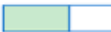

Cluster	1	2
Label		
Description		
Size	 53.53	 46.5%
Inputs	Physical Balance 7.81	Physical Balance 9.61
	Working Conditions 17.77	Working Conditions 22.67
	Compensation and Benefits	Compensation and Benefits
	Safety 11.00	Safety 13.98
	Job Elements 14.40	Job Elements 17.83
	Socialization 11.36	Socialization 13.83
	Training and Support 8.42	Training and Support 9.33

Table 5 Mean-wise Distribution of ITS Scale Variables

Descriptive Statistics									
Variables	N	Mean	Std. Deviation	RANK	Variables	N	Mean	Std. Deviation	RANK
Safety	1890	4.52	0.941	1	Ergonomics	1890	4.19	1.066	12
Training and Development	1890	4.43	0.905	2	Relationship with Supervisors	1890	4.16	1.158	13
Health Facilities	1890	4.43	0.971	2	Career Growth	1890	4.02	1.195	14
Relationship with Co-workers	1890	4.4	1.177	4	Supportive Management	1890	3.95	1.358	15
Tasks and Responsibilities	1890	4.36	1.064	5	Grievance Redressal and Counselling	1890	3.92	1.275	16
Working Condition	1890	4.34	0.928	6	Terms and Conditions	1890	3.9	1.305	17
Supervision	1890	4.31	1.131	7	Location	1890	3.74	1.345	18
Hostel Life	1890	4.27	1.058	8	Achievement Recognition	1890	3.49	1.431	19
Working Hours / Shift	1890	4.27	1.028	8	Work-Life Balance	1890	3.16	1.476	20
Socialization	1890	4.21	1.304	10	Salary	1890	2.89	1.399	21
Workload	1890	4.21	1.127	10	Hostel Food	1890	2.58	1.356	22

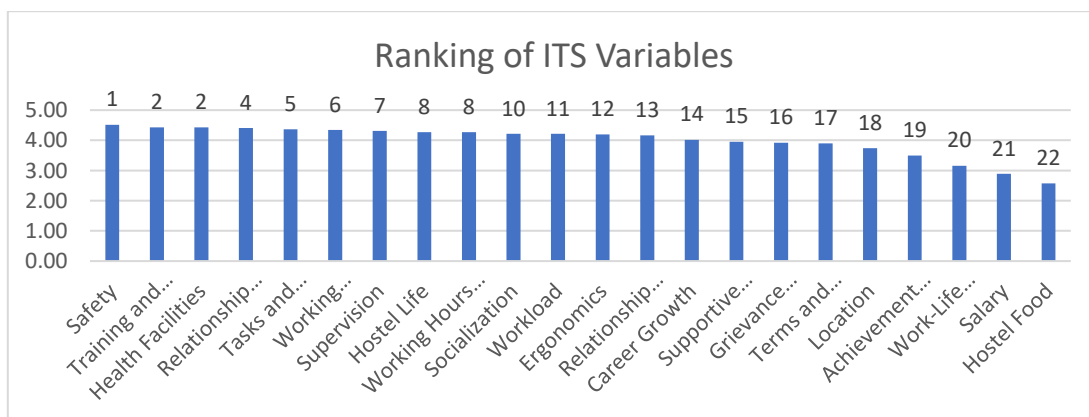


Chart 4 shows the Ranking of ITS Variables