

PROJECT REPORT

CORPORATE EMPLOYEE ATTRITION ANALYTICS

TEAM ID:PNT2022TMID46129

TEAM LEADER :

KRISHNAPRIYA .R(815119104022)

TEAM MEMBER :

ANBARASI .S(815119104007)

TEAM MEMBER :

BIRUNDHA.V (815119104010)

TEAM MEMBER :

MAHESHWARI.K(815119104028)

TEAM MEMBER :

MAHALAKSHMI .G (815119104026)

DHANALAKSHMI SRINIVASAN
INSTITUTE OF TECHNOLOGY, SAMAYAPURAM
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1.INTRODUCTION

1.1 PROJECT OVERVIEW

Employee attrition is defined as the unpredictable and uncontrollable, but normal, reduction of the workforce due to resignations, retirement, sickness, or death. The employee attrition rate measures the number of people who move out of a

company and are not replaced. Employee retention is crucial to your company's success and the attrition rate is the metric that provides insight into how well you're retaining your employees.

Measuring and analysing your company's attrition rate will allow you to determine how many employees left your company within a certain period and understand why they left. Then, you can develop relevant and effective retention strategies to reduce attrition within your organisation.

1.2 PURPOSE

The key to success in any organization is attracting and retaining top talent. As an HR analyst one of the key tasks is to determine which factors keep employees at the company and which prompt others to leave. Given in the data is a set of data points on the employees who are either currently working within the company or have resigned. The objective is to identify and improve these factors to prevent loss of good people.

2.LITERATURE SURVEY

2.1 EXISTING PROBLEM

So why is attrition such a problem? Among the most common reasons for turnover in the contact centre are:

- ***Inappropriate candidate selection for the role and the culture:*** Regardless of industry, survey after survey finds employers complaining about how difficult

hiring is. When organizations are unable to identify individuals who will do their job well within their specific organization, attrition skyrockets.

- **Employee disengagement:** Employees who aren't engaged are more likely to leave. One Gallup survey found that organizations whose employees reported high engagement had 25% to 65% less attrition than their peers.

- **Low job satisfaction:** Employee satisfaction is directly linked to attrition, both in the short-term (immediately after hire) and the long-term.

- **Excessive pressure and stress:** Workplace stress in America is estimated at over \$300 billion annually, and some experts estimate that up to 40% of turnover is due to stress

- **Inflexible working environment:** Employees who are unable to balance their professional and personal lives, including taking time off for doctor's appointments and to care for children, are more likely to search out other, more flexible, employers. In fact, one survey reported by the Society for Human Resource Management found that a majority of employees (78%) said a flexible work arrangement would allow them to live a healthier life, while 86% said they would be less stressed.

- **No career growth or development opportunities:** Global Talent Monitor's report on workforce activity shows that the lack of future career development remains a key driver of employee attrition — 40% of departing employees say it led them to be dissatisfied with their jobs, Gallup reports .

- **Lack of recognition:** More than 65 percent of employees report they don't feel recognized at work, according to Human Resources Today, and this fuels attrition.

- **Abusive calls:** One researcher found that agents can average up to 10 hostile encounters a day, which takes a toll on morale and encourages employees to leave .

On their own, each of these factors has a significant impact on attrition. Together, they magnify the challenge contact centres face in keeping attrition at a manageable level.

2.2 REFERRAL LINK:

<https://ieeexplore.ieee.org/document/8541242>

<https://ieeexplore.ieee.org/document/9825342>

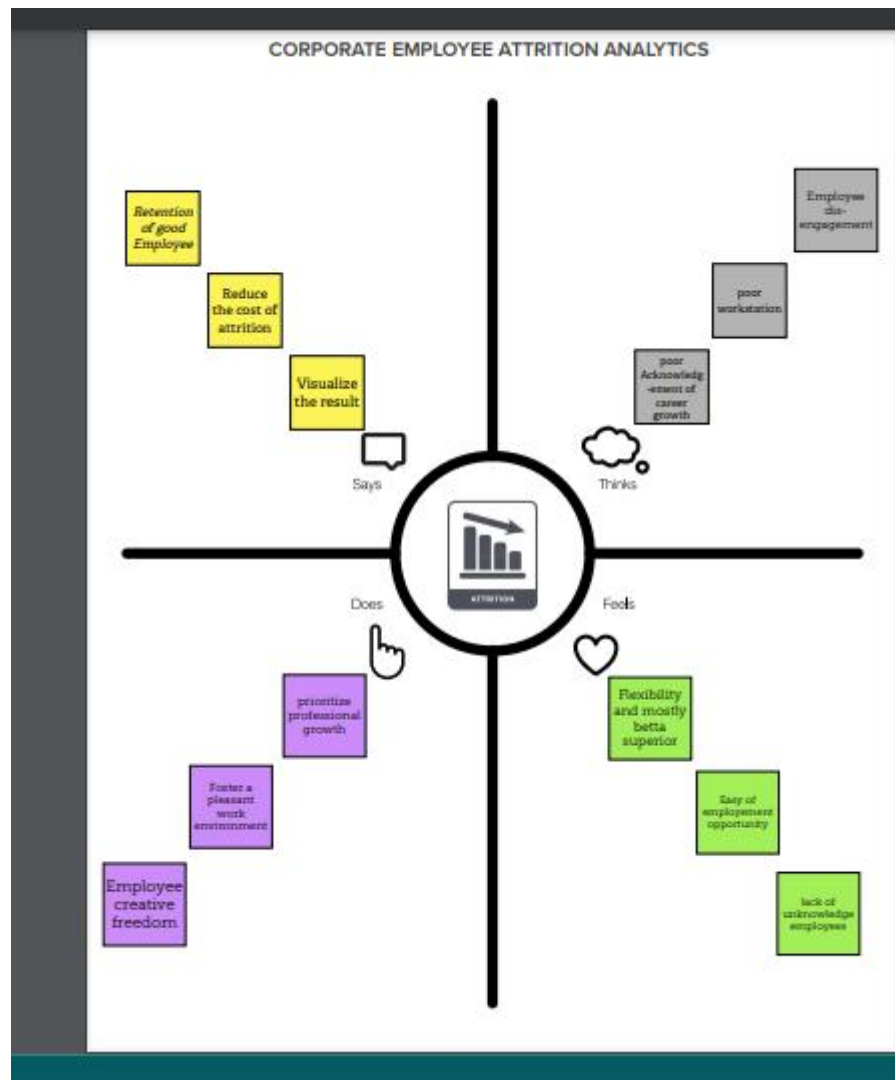
2.3 PROBLEM STATEMENT DEFINITION:

I am an employee. *I am trying* to collect and analyse the data sets with a proper understandability and process, implement for further analyses. *But* I am unable to collect the proper datasets and proceed to next steps. *It is because* of the improper datasets collected which may have some missing values, false values or null values. *It makes me* feel to maintain the proper records of datasets further to process the implementation of artificial analytics

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS:

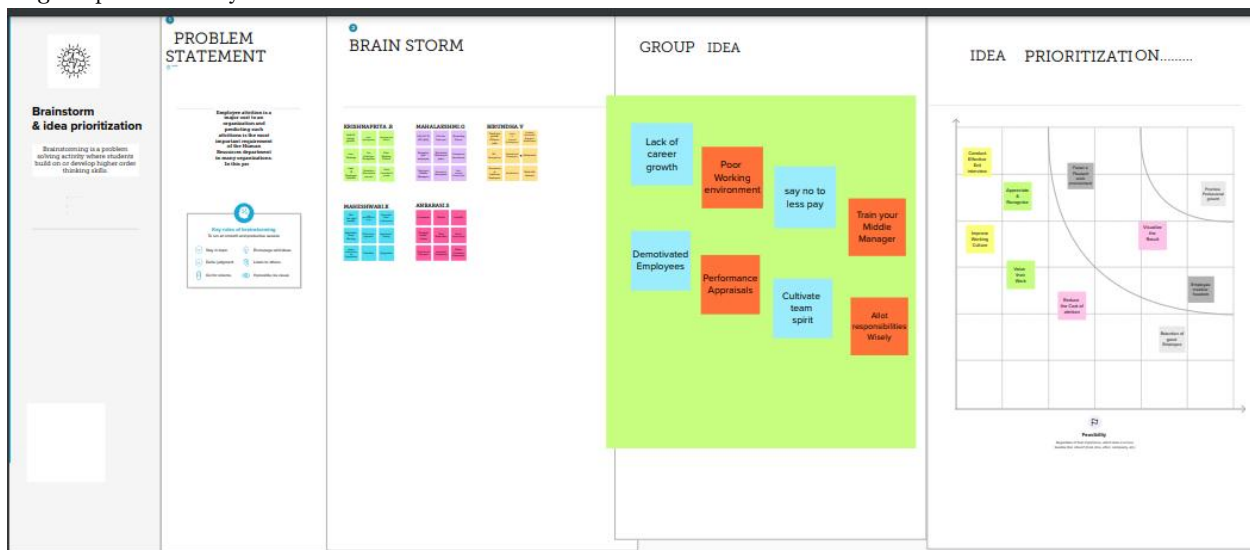
An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.



3.2 IDEATION AND BRAINSTORMING:

Ideation is the process of forming ideas from conception to implementation, most often in a business setting. Ideation is expressed via graphical, written, or verbal methods and arises from past or present knowledge, influences, opinions, experiences, and personal convictions.

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A principal difference between ideation and brainstorming is that ideation is commonly more thought of as being an individual pursuit, while brainstorming is almost always a group activity.



3.4 PROBLEM SOLUTION FIT:

A. CUSTOMER SEGMENTS

► The customer of this project will be the HR professionals, the administration or the person with the higher power authority who are responsible for their lower level employees.

► The customer uses the employee data.

B. JOBS-TO-BE-DONE / PROBLEMS

- Initially the data has to be collected and formatted in a proper way.
- A deep analysis of the employee data should be done In order to gain the results.
- The problem which may arise here is sometimes the data may be an invalid or incorrect data which affects the results.

C. TRIGGERS

- With this analysis, the employee will be more aware of his responsibilities being done.
- It encourages good employees to step forward in their career and it serves as a warning for those employees who are not being responsible in their work.

D. EMOTIONS: BEFORE / AFTER

- The good employees will be encouraged and the irresponsible one will be noticed.

E. AVAILABLE SOLUTIONS

- Initially the performance of the employee is observed manually by the higher officials.
- But this may led to imbalance in treating all employees as same.
- But the analysis will be completely digital so that there any not occur any favourism.

F. CUSTOMER CONSTRAINTS

- The constraints which the customer would face may be the lack of skilled employee or the amount of surplus employee would bring the issue in decision.

G. BEHAVIOUR

- Directly related with the higher authorities.
- Indirectly related with the knowledge of the employees.

H. CHANNELS OF BEHAVIOUR

- ONLINE:

The customers can perform visualization using different graphs, can draws many useful insights from it

➤ **OFFLINE:**

Using the results which was collected the action may be taken offline.
Preparing data sets can be done offline.

I.PROBLEM ROOT CAUSE

The main thing to do an analytics of this is :

- to identify the potential employees
- To find the reason of employee attrition
- To improve the organization profit by retaining good talents
- To consider every employee performance in bias.

J. SOLUTION

➤ The solution would be the attrition anayltics which gains the useful results which may be beneficial both to the employees as well as to the organization.

4.REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data collection	1. Collecting data from company administration 2. Collecting data from company database
FR-2	Representation of data	3. Presenting data in excel sheets
FR-3	Analysing data	4. Performing various visualization techniques

		5. Creating dashboards, stories, graphs, charts, etc.
FR-4	Preparing reports	6. Analysing the results from the data analysis performed. 7. Preparing reports 8. Taking necessary action if required

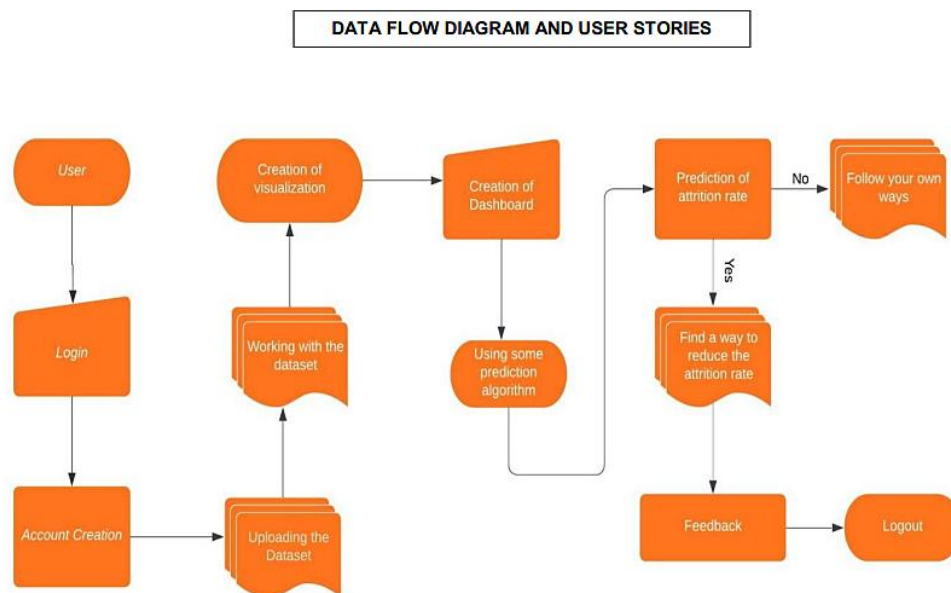
4.2 NON FUNCTIONAL REQUIREMENTS:

FR No	Non-Functional Requirement	Description
NFR-1	Usability	This software shall be easy to use for all users with minimal instructions. 100% of the languages on the graphical user interface (GUI) shall be intuitive and understandable by non-technical users.
NFR-2	Security	The user of the system should be provided the surety that their account details are secure. The system will provide security against cross site request forgery
NFR-3	Reliability	The software shall be operable in all conditions. The system must be less prone to error
NFR-4	Performance	The performance of the system must assist the system's quality

NFR-5	Extensibility	The software shall be extensible to support future developments and add-ons.
NFR-6	Portability	The software shall be 100% portable to all operating platforms. Therefore, this software should not depend on the different operating systems.

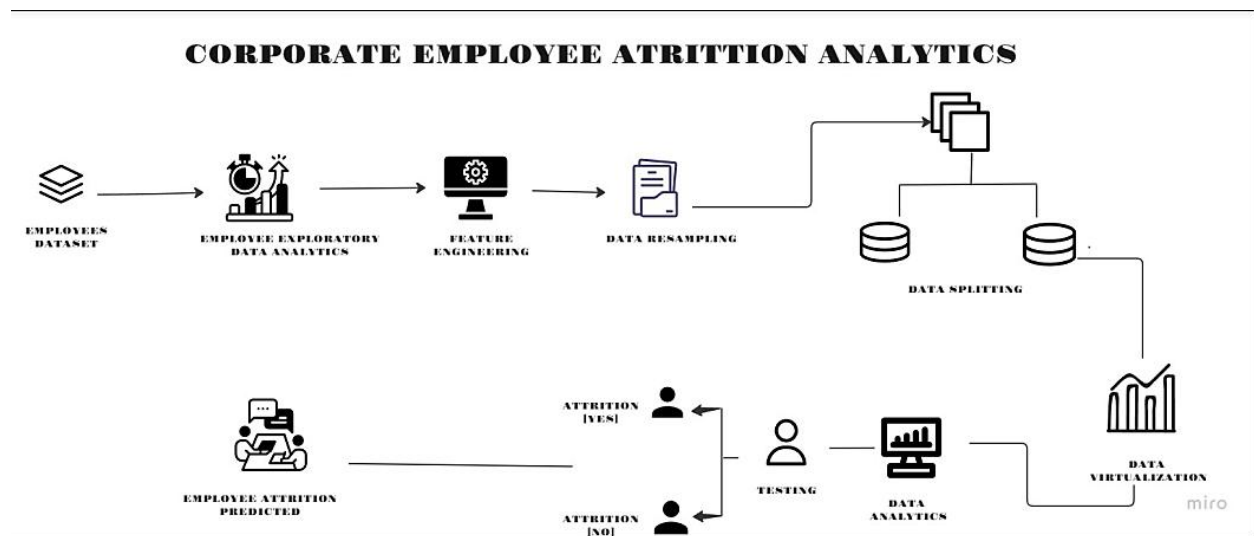
5.1. Data Flow Diagrams

A data-flow diagram is a way of representing a flow of data through a process or a system. The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow — there are no decision rules and no loops.



5.2 SOLUTION AND TECHNICAL ARCHITECTURE:

Based on the complexity of the deployment, a solution architecture diagram may actually be a set of diagrams documenting various levels of the architecture. The diagram relates the information that you gather on the environment to both physical and logical choices for your architecture in an easily understood manner.



5.3 USER STORIES:

➤ CUSTOMER(SUPPORT ROLE WORKERS):

As a user, I collect the required information about the corporate employee from the higher officials or from the office administration. As a user, I can also get the employee details through the company database. As a user, I segregate the data in a

representable form which is used for the further steps.

➤ **CUSTOMER(DATA ANALYST):**

As a user, I analyse the data through visualization. As a user, I analyse the data through dashboards As a user, I analyse the data in the form of stories, graph, reports, etc. As a user, I finally represent the results gained from the data analytics.

➤ **HR:**

As a user , I can prepare reports from the data analysis process. From the reports, I can take necessary actions which results in employee attrition.

6.PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING ND SCHEDULING:

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I should be able to register in the application.	3	Medium	R.krishnapriya, G.Mahalakshmi, S.Anbarasi, k.Maheshwari, V.Birundha
Sprint-1	Authentication	USN-2	The registered user should be authenticated and verified and logged in.	2	Low	R.krishnapriya, G.Mahalakshmi, S.Anbarasi, k.Maheshwari V.Birundha
Sprint-2	Dataset upload and creating dashboards.	USN-3	As a user, I should be able to upload the dataset and do exploratory analysis and explore patterns.	2	Medium	R.krishnapriya, G.Mahalakshmi, S.Anbarasi, k.Maheshwari V.Birundha
Sprint-2		USN-4	I present the data using analytical tools and present the data using charts and graphs.	3	Medium	R.krishnapriya, G.Mahalakshmi, S.Anbarasi, k.Maheshwari V.Birundha
Sprint-3	Model creation and testing	USN-5	I split the data into test and train data and create the model.	5	High	R.krishnapriya, G.Mahalakshmi, S.Anbarasi, k.Maheshwari V.Birundha
Sprint-4	Model Output	USN-6	The model is used to predict the attrition rate.	5	High	R.krishnapriya, G.Mahalakshmi, S.Anbarasi, k.Maheshwari V.Birundha

6.2 SPRINT DELIVERY SCHEDULE:

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	6 Days	24 Oct 2022	29 Oct 2022	5	29 Oct 2022
Sprint-2	5	6 Days	31 Oct 2022	05 Nov 2022	5	05 Nov 2022
Sprint-3	5	6 Days	07 Nov 2022	12 Nov 2022	5	12Nov2022
Sprint-4	5	6 Days	14 Nov 2022	19 Nov 2022	5	19Nov2022

Velocity:

We have an 6-day sprint duration, and the velocity of the team is 4 (points per sprint). To calculate the team's average velocity (AV) per iterationunit (story points per day)

$$AV = \frac{\text{SPRINT DURATION}}{\text{VELOCITY}} = \frac{6}{4} = 1.5$$

7.CODING AND SOLUTIONING

7.1 FEATURE 1:

In this project , we have done visualization by considering several criterias like

- age
- gender
- department
- business travel
- number of companies worked
- monthly income, etc.

Considering all this during the visualization process makes it more accurate to exactly identify the root caue for the attrition of the employees.

7.2 FEATURE 2:

The dataset is also understood by various factors to consider the missing or unnecessary values in it. Python is used in order to make the process quite easy and visualisation is also performed using python. Random forest classifier is used in training and testing the datasets which yields almost 97% of accuracy.

8.TESTING

8.1 TESTCASES:

A test case is a set of actions performed on a system to determine if it satisfies software requirements and functions correctly. A test case is a document, which has a set of test data, preconditions, expected results and postconditions, developed for a particular test scenario.

In this project the system is tested and trained based on the employees attrition.

- What are all the conditions which lead to employee attrition?
- Which factor is more responsible for the attrition to occur?
- What are the root causes which lead to the attrition?
- How to retain talented employees?

- What necessary steps to be taken to avoid these conditions?

8.2 USER ACCEPTANCE TESTING:

User acceptance testing (UAT), also called application testing or end-user testing, is a phase of software development in which the software is tested in the real world by its intended audience. UAT is often the last phase of the software testing process and is performed before the tested software is released to its intended market. The goal of UAT is to ensure software can handle real-world tasks and perform up to development specifications.

In UAT, users are given the opportunity to interact with the software before its official release to see if any features have been overlooked or if it contains any bugs. UAT can be done in-house with volunteers, by paid test subjects using the software or by making the test version available download as a free are forwarded to the developers, who make changes.

9.RESULTS

9.1 PERFORMANCE METRICS:

1. Attrition status by age :

- visualization performed by column chart
- Age by status = 92%

2. Employee count by department :

Visualization performed by bar chart

Employee count by department wise

- Human resource = 17%
- R&D = 89%
- Sales = 60%

3. Attrition based on business travel :

Visualization performed by waterfall chart percentage by business travel

- Non-travel =25%
- Travel frequently =75%
- Travel rarely =35%
- Sum=100%

4. Attrition based on department ,job role ,education &marital status:

Visualization performed by line & column chart percentage by Department wise

- i. Human resource =15%
- ii. R&D =85%
- iii. Sales =45%
- iv. Education =69%
- v. Job role =100%
- vi. Marital status
 - Male =80%
 - Female =20%

5. Attrition based on salary hike percentage :

- Visualization performed by pie chart
- Salary hike percentage (overall) =95%(based on department wise)

6. Based on No.of companies worked:

Visualization performed by stocked column chart

No. of companies worked based on attrition

- i. Human resource =15%
- ii. R&D =65%
- iii. Sales =35%

7. Visualization based on monthly income groups :

Visualization performed by scatterplot chart

- Monthly income percentage = 100%

8. Prediction based on employee working groups :

Visualization performed by network chart employee working groups

- percentile =75%

DASHBOARDS:

1. Attrition based on department by age department (visualization performed by bar chart)

- Human resource =17%
- R&D =89%
- SALES =60%
- OVERALL =91%

2. Analysis based on job involvement in daily rate :

Visualization performed by heat plot chart job involvement

- percentage =99%

3. Based on attrition :

- Visualization performed by scatterplot
- Attrition percentage =66%
- Business travel =99%

4. Calculating the employee performance :

Visualization performed by column chart

- No.of companies worked =59
- Performance rating =84%

10.ADVANTAGES &DISADVANTAGES

ADVANTAGES:

- It brings to fore the cause of employee disengagement.
- Enables HR managers develop long-term strategies to reduce attrition

- Competitive measures to enhance company brand image
- Develops and shapes drills that benefit both the management and the employees
- Enhanced work culture
- When employers do not fill up the vacant position, departmental workflows can be changed. The company can assign new duties to the rest of the employees and shift resources allocated for that position within the organization.
- When employees leave the company voluntarily, labor costs on the company reduce that can be allocated in other areas. Labor costs refer to the wages of those employees, along with appraisals and bonuses.
- Organizational culture improves if the employees that are troublesome and negatively impact the company culture leave through attrition.
- When some employees retire or resign, this can be considered a fresh start for the company, and the current employees can be offered new opportunities or new positions can be created that would add to the productivity of the company.
- If underperforming employees leave the company, this can pose a positive impact on the company's productivity. Underperforming employees often hinder their work efficiency and influence other employees if they are hired at important positions. Through attrition, the company becomes able to solve this problem without turnover or layoffs.

One of the known facts about attrition is it cannot be eliminated from the company. It is a part of every organisation as employees are free to leave the organisation. However, through attrition analysis, one can only reduce the rate of employee exits.

DISADVANTAGES:

When employees leave the organization it is a loss to the company, the team and the individuals. Employees are the backbone of any organization and their departing may lead to lot of various losses to company on different aspects. The disadvantages can be

1. Decreased overall performance:

The whole business process is affected when an employee leave the organization. It is even more risky when this happen all of a sudden. There is no time to train the new employee who is to take over the job and the whole team gets affected. It can directly be seen in an overall decrease of performance of the team. Sometimes this may even lead to drastic change in customer relationship. Customers connect with employees in an organization and those leaving all of a sudden may lead to doubts in customer' s minds as well.

2. Daily task management:

Sudden attrition may lead to difficulty in managing daily tasks. Even large organization struggle to manage their task when employees leave jobs, getting small information and managing daily tasks become difficult as they cannot be managed by small current team which is left behind. Organization generally have notice period to ensure there is a smooth transition but attrition states otherwise, employees who leave suddenly leads to unmanageable daily routines.

3. Increased cost:

This has to be the highest disadvantage to a company when employees leave their jobs. There is increased cost

associated with every level of the process - *losing and paying the previous employee, hiring a new one, training cost for the new employee.* Research shows that these costs are way more than the losses incurred in managing and missing out on work.

4. Lack of knowledgeable employees:

This goes without saying when employees leave an organization they take with them the experience they have gained overtime. With organizations which has high attrition rate the average years of experience of employees is really low. This result in low performance, lack of loyalty and cluelessness on what company has been through. Older employees with their years of experience can take over critical matters which can never be trusted with these new employees. Even with employees who have experience are hired they may suffer at taking care of critical business matter as they are new to company' s policies, culture and current employees.

5. Create a Negative image:

It is not just that employees are looking for job, even organizations are on the outlook of qualified professionals. When any company has high attrition rate it negatively impact the brand of the organization. Recruiters' state that they find it difficult to map qualified candidates to the organization, as candidates opts out fearing the attrition rate. The reasons may vary but a negative image work against the organization.

6. Employee development:

Many organizations have various employee development plans and higher attrition rate means losing out on it. Employee development plans takes time and huge investments. When there is disturbance within the organization due to employees leaving the organization it affects the development process for all. The money invested on the employee who leave is wasted; also it affects others who have to jump in to fill in for the lost employee affecting their career plan and growth. These plans are structured and require dedication and time to reach the goals.

11.CONCLUSION

The study on attrition analysis highlighted, so many factors which will help to the employees. The study was conducted among 1241 employees and collected information through structured questionnaire and the project was carried out in a good manner and has met the expectations of the organization. The main objectives of a program to reduce a attrition in a corporate and to find the reason for the same. So that employees are better equipped to do this job for increase a salary and employees should satisfied with career development opportunity from the corporate side too.

12.FUTURE SCOPE

Further enhancement can be made by preserving the datasets prior in need. Several other methods can be implemented for analysing the datasets. Performing attrition analytics in every corporate will help to achieve a better profit to the organization and the better environment which exists within the organization.

13. APPENDIX

Demo Link:

<https://drive.google.com/file/d/1ICI-cWVRxioHIbYP0mtSQ0opziD6oP9x/view?usp=drivesdk>