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Exploring Trends and Insights: A Comprehensive Analysis of Sansera Employee Data Over Four Years through Excel and Interactive Dashboard

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Abstract: In this Data analysis project, the three main objectives of data analysis • Data Cleaning • Data Analysing • Data Visualization/ Presenting The above objectives include the following learning: • To approach a data analysis project, systematically clean data, doing Exploratory Data Analysis (EDA) with excel formulas and tables, use Power Query to combine two datasets, statistical Analysis of data. • Dashboard Creation: Insert slicers to filter data dynamically. Slicers provide interactive controls that allow users to easily filter data based on criteria such as department, location, or job title. Set up a mechanism to update data automatically or manually to ensure the dashboard reflects the latest HR information. Test the dashboard functionality and usability thoroughly. Gather feedback from stakeholders to refine and improve the dashboard based on their needs and preferences.

Keywords: Data Analysis, Interactive Dashboard, Data Visualization, Business Intelligence, Predictive Analytics, Real-time Dashboard, Statistical Analysis, Quantitative Analysis, Performance Metrics.

I. INTRODUCTION

A. Background

Data analytics is the practice of extracting information from raw data, organizing it, and analysing it in order to generate actionable insights that are used to make informed business decisions. Most companies collect large amounts of data on a regular basis, but this data is often not very useful in its current form. That's where a data analyst comes in. They analyse the raw data and transform it from raw numbers to more meaningful information. The data analyst then provides recommendations or advice on what the company should do next. Data analytics is a type of business intelligence that is used to identify and address specific issues and problems in an organization. The goal of data analytics is to identify patterns within a dataset that can provide valuable information about a specific business area. For example, how certain customer groups act or how employees interact with a tool. Data analytics allows you to understand the past and anticipate future trends and behaviour. Instead of relying on guesswork to make decisions and strategies, you're making informed decisions based on what data tells you. Data analytics allows businesses and organizations to gain a much deeper insight into their audience, industry, and company—allowing them to make better decisions and plan for the future.

B. Problem Statement

"Formulate and execute the creation of an extensive dashboard aimed at visually elucidating pivotal metrics and trends derived from a longitudinal analysis of employee data spanning the preceding four years. The dashboard is intended to offer insights into multifaceted aspects such as employee demographics, performance indicators, retention rates, and additional pertinent variables pivotal in comprehending the intricate dynamics inherent within the organizational workforce. The overarching objective is to foster evidence-based decision-making processes while furnishing stakeholders with a lucid comprehension of the evolutionary trajectory exhibited by the workforce within the designated temporal scope."

C. Objectives

- 1) Data Cleaning and Transformation ,Data Import and Manipulation
- 2) Data Connection and Integration:
- 3) Advanced Data Visualization, Aggregation and Summarization

D. Significance

It refers to the range, extent, or breadth of sales data analysis, it defines the boundaries or limits of what is considered or addressed. It outlines the specific areas or aspects covered and helps set expectations regarding the depth and breadth of the sales data analysis, it refers to the various applications, domains, and specific aspects can be applied and provide valuable insights such as Data Cleaning, Data Import and Manipulation, Basic Data Visualization, Data Connection and Integration, Forecasting and Trend Analysis, Data-Validation, Slicer and Conditional-Formatting.

II. LITERATURE REVIEW

- 1) Marler and Boudreau (2017) highlight the transformative impact of HR analytics, noting that organizations using advanced analytics report higher levels of employee productivity and retention.
- 2) Fitz-enz and Mattox (2014) discuss the strategic advantages of workforce analytics, emphasizing the role of data in driving organizational performance and employee satisfaction.
- 3) Paret et al. (2018) examine the effectiveness of Excel in handling large datasets, finding it particularly useful for preliminary data analysis and visualization.
- 4) Chen et al. (2016) explore the use of Excel's built-in functions and macros for automating repetitive tasks, thus enhancing efficiency in data processing.
- 5) Paret et al. (2018) examine the effectiveness of Excel in handling large datasets, finding it particularly useful for preliminary data analysis and visualization.
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- 8) Chen et al. (2016) explore the use of Excel's built-in functions and macros for automating repetitive tasks, thus enhancing efficiency in data processing.

III. METHODOLOGY

A. Research Design

- 1) *Identify Data Sources:* Determine the sources of employee data that will be used to populate the dashboard. This may include data from HRIS systems, performance management systems, time tracking software, surveys, and other sources.
- 2) *Segmentation:* Consider segmenting the employee population based on relevant criteria such as department, job role, location, tenure, performance level, or any other demographic or organizational characteristic that is meaningful for analysis.
- 3) *Sampling Method:* Choose an appropriate sampling method based on the objectives of the dashboard and the characteristics of the employee population. Common sampling methods include:
 - **Random Sampling:** Select a random sample of employees from the population to ensure representativeness and minimize bias.
 - **Stratified Sampling:** Divide the employee population into homogeneous groups (strata) based on relevant criteria, then randomly sample from each stratum to ensure representation of different segments.
 - **Cluster Sampling:** Divide the employee population into clusters (e.g., departments, teams, locations), randomly select clusters, and include all employees within the selected clusters in the sample.

B. Sample Size

The appropriate sample size based on statistical considerations such as the desired level of confidence and precision. The larger sample size provided more accurate estimates, but it may not always be feasible or necessary depending on the size of the population and the objectives of the dashboard. Sample size: 22,129

C. Data Collection

Data collection for employee data involves gathering various types of information about employee within an organisation. This can include personal details, employment history, performance metrics, and more.

SAP HR [System Applications and Products Human Resource]: in data processing is a leading enterprise software, that offers wide range of business solutions to help organizations manage various aspects of their organizations.

SAP HR, also known as SAP Human Resources, is a module within the SAP ERP (Enterprise Resource Planning) system that is specifically designed to manage various HR functions and processes within an organization. It has since been renamed SAP HCM (Human Capital Management), and now it's part of SAP SuccessFactors, an integrated suite of cloud-based human capital management (HCM) software solutions.

D. Data Analysis

Clean data, analyse data and Present data with excel

Microsoft-Excel continuous to be the number one software for data analysis. I have used a fictional data set of Sansera employee data. Quick Analysis with Excel, Build Information Finder with Excel, To build an information retriever or information finder, wherein if you type employee name you find complete employee details printed underneath, Comparison with Excel- Comparison of data can be done through formulas and filters, but in this section, we will use Pivot tables, Bonus Calculation- According to the management decision they have decided to provide 3% bonus on salary, assuming you have been with organization for 2 years, if not you bonus would be 2%. Create a new column along the country column in the staff table in ALL STAFF spreadsheet, Data Visualization or Presentation with Excel, use charts and other data visualizations options in excel, to do some data analysis on Analyze Salary Spread, Relationship between Salary and Employee Rating , Company growth over time ,Regional Scorecard. The interactive dashboard is created using Power Query and Power Pivot.

E. Procedures

The procedure for data analysis involves several key steps, each crucial for ensuring that the analysis is thorough, accurate, and insightful. Here's a detailed procedure that is followed for analysing Sansera's employee data over four years using Excel and interactive dashboards:

- 1) Define Objective: Establish the goals and research questions for the data analysis.
- 2) Collect Data: Gather relevant data from various sources.
- 3) Data Preparation:
 - Data Cleaning: Remove duplicates, correct errors, and handle missing values.
 - Data Transformation: Format data consistently and create new variables as needed.
- 4) Data Exploration:
 - Descriptive Statistics: Calculate basic statistics to understand data characteristics.
 - Visual Inspection: Create initial charts and graphs to inspect data visually.
- 5) Hypothesis Testing:
 - Formulate Hypotheses: Develop hypotheses based on initial observations.
 - Statistical Tests: Use statistical methods to test these hypotheses.
- 6) Advanced Analysis:
 - Trend Analysis: Examine data trends over the four-year period.
 - Segmentation: Segment data by different variables to compare subgroups.
 - Predictive Modelling: Apply models to predict future trends.
- 7) Data Visualization:
 - Dashboard Creation: Design interactive dashboards.
 - Identify KPIs: Determine key performance indicators to visualize.
 - Interactive Elements: Add features for dynamic data exploration.
- 8) Interpretation of Results:
 - Generate Insights: Draw meaningful conclusions from the data.
 - Comparison with Benchmarks: Compare results against benchmarks or goals.
- 9) Reporting and Presentation:
 - Compile Findings: Prepare a comprehensive report of the analysis.
 - Create Visualizations: Use dashboards to present findings clearly.
 - Provide Recommendations: Offer actionable recommendations based on insights.

10) Review and Iterate:

- Gather Feedback: Collect feedback from stakeholders.
- Iterative Analysis: Refine analysis based on feedback.
- Update Dashboards: Regularly update dashboards with new data and insights.

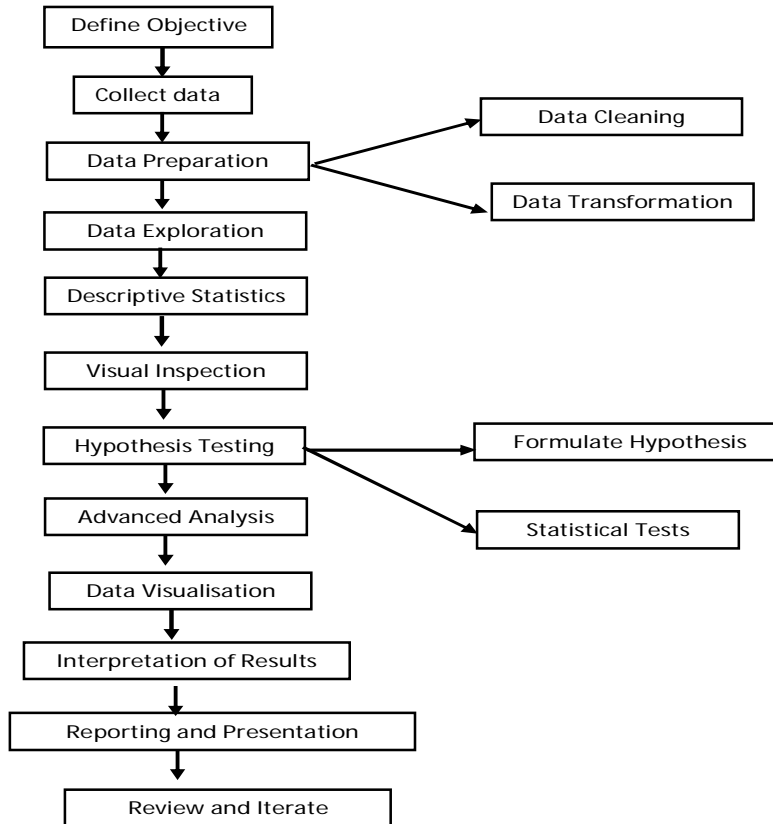


Fig 1.1 Flowchart of Data Analysis Flowchart.

IV. FINDINGS AND INTERPRETATION



Fig 1.2 Dashboard

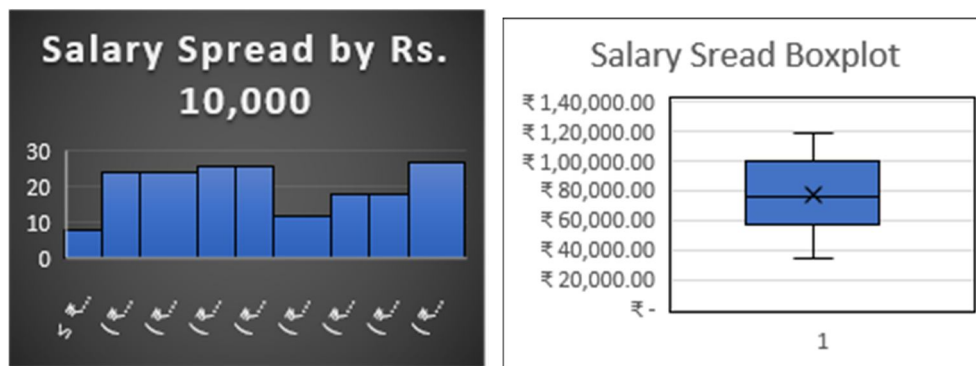


Fig 1.4 Salary Spread Boxplot

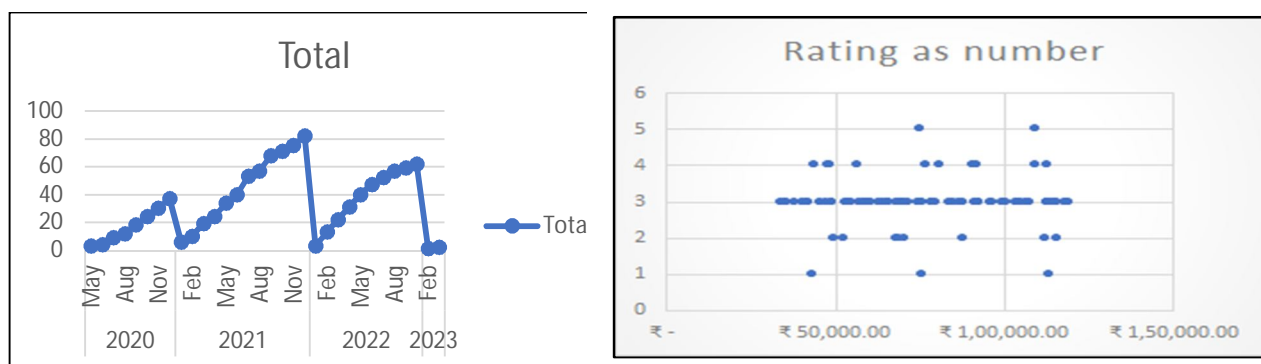


Fig 1.5 Company Growth Overtime and Rating as Number

V. CONCLUSION

The primary aim of this study was to develop a comprehensive dashboard facilitating the analysis of four years' worth of employee data, thereby enabling stakeholders to derive meaningful insights into prevailing employee trends and patterns. Through rigorous data cleansing methodologies, inconsistencies and errors within the employee dataset were diligently identified and rectified, ensuring data integrity for subsequent analyses. Leveraging sophisticated analytical tools, an in-depth exploration of the employee dataset was conducted to discern trends encompassing turnover rates, performance metrics, and demographic distributions. These findings provided a holistic comprehension of organizational dynamics over the specified four-year period.

The analysis unveiled significant trends, including the discerned correlation between employee satisfaction scores and retention rates, thereby accentuating the imperative of implementing employee engagement initiatives. Furthermore, demographic trends delineated areas necessitating targeted recruitment strategies to promote diversity and inclusivity within the workforce. The interactive dashboard offers stakeholders intuitive visual representations, enabling them to dynamically interrogate employee data and swiftly glean actionable insights.

VI. RECOMMENDATIONS

- 1) *Real-Time Updates:* Employ mechanisms for automated data updates or real-time integration with pertinent data sources to ensure stakeholders access the most contemporaneous information. This could encompass establishing automated data pipelines or interfacing with relevant data repositories.
- 2) *Predictive Analytics:* Integrate predictive analytics models to prognosticate future employee trends predicated on historical data patterns. Such predictive models offer the potential to pre-empt challenges such as sudden surges in turnover or identify avenues for talent cultivation and succession strategizing.
- 3) *Benchmarking Features:* Incorporate benchmarking functionalities permitting stakeholders to juxtapose employee metrics against industry benchmarks or competitor standards. This facilitates a contextualized assessment of organizational performance and the pinpointing of areas ripe for enhancement.
- 4) *Customizable Reporting:* Furnish users with the capacity to generate tailored reports tailored to their idiosyncratic requisites and preferences. Provisioning options for data filtration, segmentation, and multi-format exportation enriches the dashboard's versatility across a spectrum of stakeholders.



- 5) *User Training and Support*: Provide comprehensive instructional sessions and support infrastructure to equip stakeholders with adept navigation and utilization of the dashboard's functionalities. This might encompass pedagogical resources such as tutorials, manuals, and dedicated assistance channels for troubleshooting.
- 6) *Integration with HR Systems*: Investigate avenues for integrating the dashboard with extant HR systems and workflows to streamline data governance and enhance interdisciplinary collaboration. This integration might involve interfacing with HRIS platforms, performance evaluation systems, or tools for gauging employee engagement.

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