Algonquin College – Business Intelligence System Infrastructure

CST2212 300 Business Intelligence Project - Health Canada

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Abstract - In the realm of business intelligence (BI), the integration of diverse data sources and types is crucial for informed decision-making. This project addresses a prevalent challenge in Human Resources (HR) management: the disconnect between HR activities, financial management, and long-term business planning. This disconnect often arises from the dynamic nature of headcount, as employees frequently leave and replacements take time to onboard. Our project aims to bridge this gap by developing a comprehensive methodology that integrates HR, financial, and asset data into a cohesive system. The outcome will be an interactive dashboard designed for management users, showcasing trends over time and enabling future projections.

Keywords – Data Integration, Human Resources Management, Ineractive Dashboard ,Financial Mangement,Business Intelligence

I. INTRODUCTION

In today's competitive business environment, the ability to integrate and analyze data from multiple sources is essential for effective decision-making. Business Intelligence (BI) tools have emerged as critical assets in this domain, enabling organizations to synthesize diverse data streams into actionable insights. However, a significant challenge persists in Human Resources (HR) management: the difficulty in linking HR activities with financial management and long-term business planning. This challenge is exacerbated by the fluid nature of workforce dynamics, where employee turnover and the subsequent hiring processes disrupt continuity. This report details the development of a methodology to integrate HR, financial, and asset data into an interactive dashboard. This dashboard is designed to support management in visualizing trends, projecting future outcomes, and making data-driven decisions, thereby bridging the gap between HR functions and broader organizational goals.

II. METHODOLOGY

For creating this project , the task are divided into below sub task.

1. Creating the database Schema : This project comes with the benefit of open hands on the dataset. There is no particular format of the database, Therefore this opppurtunity to create and desging our own dataset was a good learning experience.
2. Populating the dataset : After deciding the schema of the dataset we need to popluate it, we used python scripts for this task,where we had the option to conditionaly generated the dataset according to our need.
3. Removing the duplicates : Many times when the dataset is populated, the entries are repeating and non uniform, thefore those need to be adjusted accordingly to the projects need.
4. Checking the dataset : Here in this phase, we create basic visual to get to know if we need to edit the dataset to further refine the visuals.
5. Preparinng the model in PowerBI : Once the dataset is prepared, the next phase is modeling where distribution of atrrinutes is done to difeerent dimensions and their relation is made to the main fact table.
6. Creating Dashboard 1,2 and 3: Here the main focus is to create the visuals according to the clients need, the focus is to concentrate on the simplifying the client problem that is helping the management to have insights on the company employes on the basis of HR, Financial and Assest holdings.
7. Theme Selection: Color scheme enhances clarity by ensuring contrast and highlighting key insights, facilitating quick comprehension. Aligning colors with organizational branding ensures consistency and professionalism. Accessibility considerations, like colorblind-friendly palettes, broaden audience reach and inclusivity. Effective color use reduces cognitive load, enabling efficient information processing. Additionally, colors can evoke emotions and set the visualization's tone, enhancing user engagement. Thus, a well-chosen color scheme is fundamental for creating impactful and accessible visualizations.

III. DATABASE SCHEMA

Creating a database schema for a project involves a stuctured approach to ensure smooth running of the data.First the specific requirements of the project should be understood like the datatypes,relatoinsships and constrains, then a ER diagram is made to visually map out the entities, following this tables of each entity should be created defined by appropriate fields and data types.Primary keys are established to uniquley identify records and foregins keys would be used to maintain referential integrity between tables.A Star Schema structured appoarch is taken into consideration where all the numeric and quantitative values are grouped together into a fact table and all the other tables are named as dimension table are connected to that fact table.

IV. POPULATING THE DATASET

For populating the dataset there few options like, first to find an existing dataset with all the requirements that are needed by the project, there are certain dataset

website online that offer this service like Kaggle, Goodle Datasets, other is to use python scripts to generate the fake data by using the fake libray module in python, or the last option is to create the syntheic data online by the help of AI. After trying various these options we collectively decided to move ahead with the python scripts as it provided the maximium customizable features to us where we can make the data as desired by the project.

V. DATA MODELING

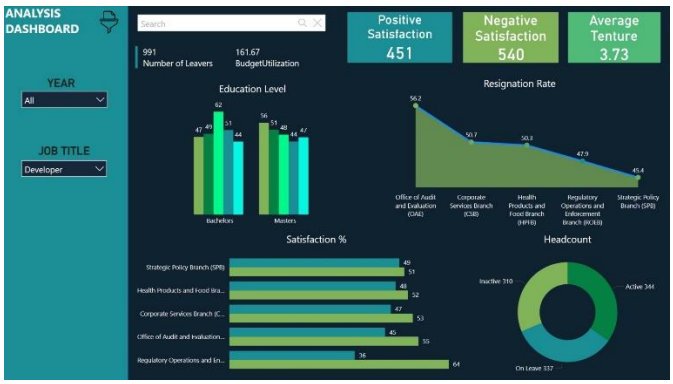
First before going forward with the data modeling, we need to make sure that the data is consistent.All the non uniform data like, the duplicates, null values and empty cells should be removed from the dataset. After cleaning the dataset approiate data modeling steps are taken like

1. Requirement Analysis: Identifying the key entites, attributes and relationships
2. Logical Data Modeling: Coverting the ER-diagram into a logical model and even normalizing the data to eliminate redundancy.
3. Physical Data Modeling: Translating the logical model.
4. Defining Keys:Establishing primary keys to uniquely identify records in each table and setting up foregin keys for reference.
5. Define Constraints : Implement constraints to maintain the data quality if necessary and creating indexes to improve query performance.

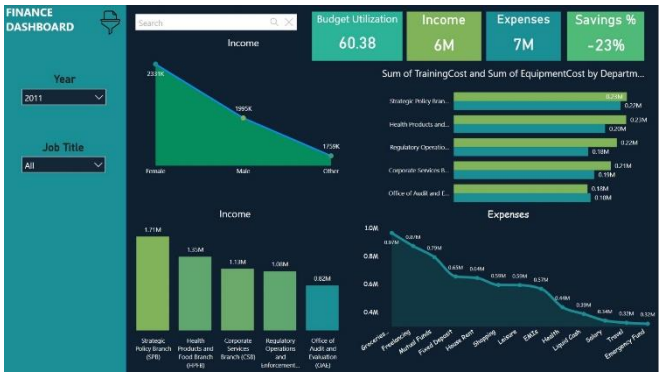
VI. POWER BI DASHBOARD

1. Sidebar : The Power BI dashboard has a side bar for easy navigation of the user in the three interfaces that are Finance dashboard, HR dashboard, Main dashboard and Assets dashboard.

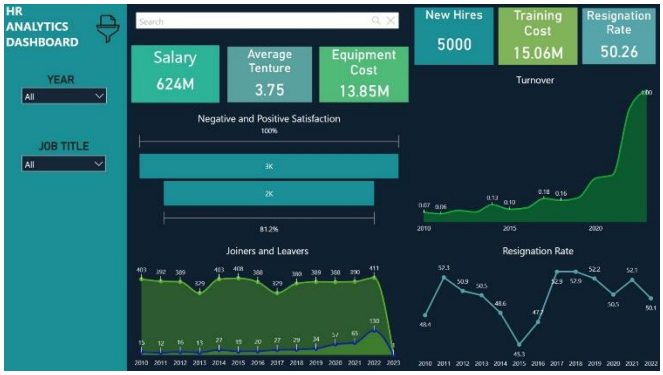
2. Main Dashboard: Gives a brief overview of the budget of the organisation in terms of totalBudget,AverageTenure,TotalBudget,BudgetUtilization,Expenses, Savings etc, It also shows the job status of the employees in the basis if active, inactive or on leave.



3. Finance Dashboard: The Finanace Dashboard gives a little detail in the expenses side of the organisation.It gives a detailed utilsation of the cost of the company in various departments.It allows to select specific expense to give a detailed report on that, also it shows the comparision between expenses and savings.



4. HR Dashboard: This dashboard deals with the information which are mostly related to the employee like average tenure, salary, new hires, training cost, resignation rate , equiment cost. The mai component of this dashboard is the count comparision of the joiners and leavers, and the satisfaction rate of the employees.



5. Assets Dashboard: This dashboard deals with the stocks options, equiment cost, training cost and total equipment cost of the company.

VII. CONCLUSION

In conclusion, the integration of HR, financial, and asset data through the development of an interactive dashboard significantly enhances the capability of organizations to make informed and strategic decisions. Our project successfully addresses the disconnect between HR activities, financial management, and long-term business planning by providing a comprehensive and cohesive system that visualizes trends, supports future projections, and aligns with organizational goals. By leveraging tools like Power BI, we have demonstrated the potential of business intelligence in synthesizing diverse data streams into actionable insights, thereby empowering management to navigate workforce dynamics and financial complexities more effectively. This project not only showcases the practical application of BI methodologies but also highlights the importance of data integration in achieving organizational excellence.

VIII. REFERENCE

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