INTRODUCTION

For a long time, decision-making and strategy implementation within a company were carried out on the intuition of top management and without the help of IT. This was because computer software at the time did not allow data retrieval from transactional applications or the complex calculations essential for generating synthetic activity reports to be performed.

With IT development and the emergence of publishers specializing in information systems, Business Intelligence projects (from Data Warehouse to Data Visualization) gradually invaded the business world.

Indeed, thanks to BI tools, it has become possible to more easily extract large volumes of data from different sources, to consolidate them in the same datawarehouse and to process them deeply to provide decision-makers as well as commercials, statistics and the relevant information they need. These key indicators will make it possible to better understand the situation of the company, to implement the best strategy and to manage the activity of the company more effectively.

Business Intelligence projects thus represent a real opportunity for companies who will rush to integrate BI tools into their information systems and thus benefit from an assured added value not only in terms of time but also in terms of money. The work carried out for this thesis fits into this context.

The work is divided into 5 chapters. Chapter 1 which gives a state of the art, chapter 2 contains the specifications, chapter 3 contains the analysis of the project, chapter 4 contains the design of the datawarehouse and chapter 5 contains the implementation and exploitation. At the end a conclusion is made and future prospects mentioned.

THESIS DEVELOPMENT

Chapter 1 : State of the Art

This part let us try to understand the various concepts which will be approached throughout the realization of the project. Starting with decision-making systems or business intelligence, then datawarehouses, ETLs, datamarts, OLAP cubes, reporting systems (data visualization) and finally the business management. The following list contains the different concepts discussed to achieve the objective of this chapter :

— Decision-making systems or "Business Intelligence"

— Datawarehouses

— ETL processes

— Data stores or "datamarts"

— OLAP cubes

— "Reporting" systems

— Business and decision-making management

Chapter 2 : Specifications

As its name, this chapter was intended to highlight the different elements present in the specifications of a project. We started by studying the problem faced by the company and from there emerged the objectives of the project. Then we discussed the needs, functionalities and constraints. Then we finished with the planning and cost estimation.

The content of this chapter is as follows :

Context : Talk about the context in which we were for the development of the project.

Problem : This was about highlighting exactly what the company is facing as a problem. It contains two parts :

— The problem analysis process

— Identifying the problem

Objectives : After asking the problems, it was a question of talking about the objectives of the project. Divided into two parts :

— Main objective

— Specific objectives

Requirements : Then we had to talk about the customer's requirements. So this part has been divided into two :

— Functional requirements

— Non-functional requirements

Expected functionalities : Knowing the needs, we were able to highlight the expected functionalities of the solution.

Constraints : Then the constraints were discussed. There were two categories : Technological and temporal.

Project stakeholders : This was the next section where the project stakeholders were mentioned with their roles in the project.

Project planning : That done, we now had to plan the project. This was done by dividing the project into phases and tasks which were represented in a table with their corresponding duration and precedence. This has been represented on a Gantt chart for better visibility and better tracking.

Cost estimation : The chapter ended with a cost estimate divided into two as follows :

— **Cost estimation method**, where the estimation methods studied and the best chosen

— **Project cost**, where the project has been evaluated.

Chapter 3 : Project Analysis

In this chapter an analysis of the project was carried out. We started by talking about the method used for the progress of the project, the tools and techniques for the good progress of the project. Then came a study of the existing system. Then the functional analysis aspect of the system to be set up was addressed, from which emerged a solution that was presented. It consists of the following parts :

Project management : Here we have discussed the following topics :

— Development process

— IS development activities

— Importance of the IS development process

— Types of development processes

— Management tools and techniques

— Presentation of the agile development process : SCRUM

— Collaborative tools

Analysis of the existing :   It was a question of doing an in-depth analysis of the system in place in order to best understand how to implement a solution. Done in three parts :

— Commercial management at AMD

— Downsides of the system in place

— Competing solutions

Functional Analysis   : Allowed us to make the complete analysis of the system to be set up. Contains the following titles :

— The functional analysis process

    — The APTE method

    — The stages of the FA

    — Requirements Analysis

    — Functional Requirements Analysis

    — Technical Functional Analysis

Accepted Solution   : Here we presented the solution with a brief description

Chapter 4 : Datawarehouse design

This chapter has been dedicated to the design of the business intelligence system data warehouse. We started by completely presenting the architecture of the system to be designed, then we designed each of the parts that constitute the establishment of a data warehouse. We started with the data warehouse, from which the data marts arose. Then we moved on to the design of the ETLs that will be responsible for filling data in our datawarehouse.

Architecture of the Business Intelligence system   : Here we have presented in a global way the architecture of the whole system, starting with the multiple sources of data, passing by the ETL, the datawarehouse, the data marts and the cubes then the visualisations.

Design of Datawarehouse and Datamarts : In this section we designed the different databases that our system will be made up of. Starting with the STAGING database which is a database for preparing data for loading into the final data warehouse. Then we designed the truly said DATAWAREHOUSE. Then the last phase was the design of the different DATAMARTS from the DATAWAREHOUSE.

ETL Design : Here we started by presenting the architecture of an ETL process. We then talked about data extraction and how the data should be extracted from the different operational databases. Then we did an analysis of the transformations that the data had to undergo to make them uniform in the warehouse. Then the different loading methods in the DATAWAREHOUSE were discussed to finalize the design of the ETLs to feed our DATAWAREHOUSE. The section closed with a review on how the ETL will be used and a presentation of the ETL designs designed.

Chapter 5 : Implementation and Operation

Final chapter of the document, it contains elements on the implementation of the system and its exploitation with the data visualization tools. We presented the designed ETLs, the data warehouse and data stores, the designed analysis cubes and a few dashboards made. We started by making a choice of system implementation tool. Hence we chose to implement our system with the MSSQL Server DBMS. The next step was to describe the installation process for SQL Server 2019, the most recent version of the software. Then we went to the creation of databases starting with STAGING, then DATAWAREHOUSE then DATAMARTS.

Then it was time to design the ETLs since they strongly depend on the database in which it will have the task of loading the data. We started by making a choice of the tool to use for the implementation. From this step emerged the SSIS tool from the Microsoft Business Intelligence tool pack. We then saw how to download and install SSIS. The next logical step was to proceed to the creation of ETLs with the tool we had just installed.

We started by creating the ETL for loading data into STAGING. The ETL's job was to extract the data from the different sources and aggregate them in the STAGING from where

they will be loaded into the DATAWAREHOUSE. Then we created the DATAWAREHOUSE power supply ETL from STAGING, then the loading ETL for the different DATAMARTS. Powering the DATAWAREHOUSE and DATAMARTS is done by simply executing stored procedures that we had previously created in our DATAWAREHOUSE.

The next step was to load the data which was done from the ODBC plug-in and a flat file connection since these are the corresponding types of our data sources.

After this it was the operating stage of the DATAWAREHOUSE. This part started with the choice of which tool to use. We went with Microsoft Power BI. Then we used the Power BI analysis module to create our data cubes which will facilitate the representations on the visuals. With our cubes we therefore created our dashboards which present easily interpretable graphs. The section and chapter ends with the deployment of dashboards on Power BI Service which the customer can access with their browser or mobile phone.

The document closes with a general conclusion of the project and some future perspectives on the expansion of the newly constructed system.

CONCLUSION

At the end of our project, we recalled that we wanted to optimize the commercial management of a company, AMD in our case through the use of a data warehouse that could be exploited for analysis and reporting purposes, making making decisions much easier for decision-makers and company salespeople. As a result, we carried out an analysis that allowed the design of a commercial management data warehouse, from which the datamarts for analysis and visualization emerged. With two dashboards to our credit in this project that allow an easy view of the evolution of certain critical trends, we can say that we have achieved our overall objective.