Business Intelligence Based Tool Development

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***Abstract* — Software applications, technologies and methodologies that perform data analysis describes the domain of Business Intelligence (BI), which is defined as a set of strategies that involves data analysis and decision-making processes. In this way, it aims to create an environment where the company can easily find, evaluate, collaborate, understand and act from high value information. BI collaborates with increasing employee awareness of the company, enabling process disclosure, feedback collection and organizational data capture to be presented to decision makers a harmonized way. This project addresses the study of BI for a tool development to assist in analyzing data at a mobile device factory in its handset return control. The methodology used in this work was an exploratory study to collect the requirements for the development of the tool, in which it was developed and presented to the users. The tool was well accepted and meets the main needs for process analysis, however to be more comprehensive, new features will be added so that the system provides maturity for decision making and contributes to the process and its medium and long term strategies.**

Keywords-*business intelligence; tool; development.*

I. INTRODUCTION

Currently, companies daily generate and process a large volume of data from a variety of business activities and processes, including procurement, manufacturing, retail, marketing, sales, and distribution. This data is often processed by a wide range of applications on the computer and has a significant importance for business entities for effective and efficient decision making. However, the main disadvantage is that they often suffer from the lack of reliable, accurate and timely information to have a meaningful purpose for decision makers.

The value of information grows exponentially with the addition of each domain of data, information or knowledge properly integrated with it. The raw data cannot provide relevant and up-to-date information about company performance to their managers. For competitive companies that want to be ahead of the competition there is a critical need for up-to-date decision-making information and to optimize critical business processes [1].

Business Intelligence (BI) is a system that integrates multiple sources of information to define strategies of differentiation and performance of the company. The use of information should help organizations understand their strategies and allow the monitoring of organizational objectives throughout the planning horizon [2]. BI is an information technology that aims to centralize multiple sources of information, using large amounts of data, stored in systems for managing databases with flexibility in access and structuring of information [3]. Business is a set of activities that lead to a goal and intelligence is the ability to understand the relationships between the facts and use that understanding as a guide that guides the actions towards a desired goal [5].

BI applications provide reports to decision makers who want to perform more in-depth strategic analysis from huge amounts of data that have expanded over a wide range of time, from various applications and productions [4].

Another aspect to be considered in relation to BI relates to the use of its tools and processes in the most different fields. In the modern competitive environment, analyzing data and predicting market trends in order to improve organizational performance is an essential business activity that requires companies in general, and among them retailers, to process and analyze large quantities of data and turn them into profits [6].

The present work seeks to develop a BI tool to collect data, allow analysis and help in decision making in a mobile device manufacturing company, which has a process of monitoring the return of defective devices to the factory.

This paper is organized as follows: In Section 2 the proposed method is presented; Section 3 introduces the tool; The partial results are described in Section 4. Finally, the conclusions are summarized in Section 5.

II. METHODOLOGY

For this research, the following steps were executed (Figure 1):

1. Parallel review of the literature with the exploratory study to collect the requirements for the software.
2. Development of the initial proposal.
3. Verify if tool is satisfactory to accomplish deployment.

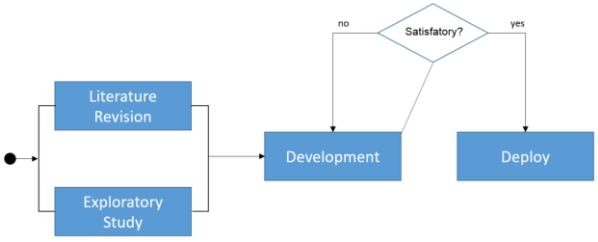

Figure 1. Methodology Overview.

In order to better understand the need to develop the tool, an exploratory study about defective device was carried out in the Quality Department of a mobile device factory. Then, it was noticed that every month there are a massive data accumulation generated by manually data comparisons carried out during the management of the return process of defective devices in which it starts from the exit of the products of the store until the return to factory. The data is analyzed through spreadsheets and manually through paid software.

In addition, other characteristics relevant to the collection of requirements were identified, which allowed the modeling of the software. It was observed that it is important to display the main information of the data, such as:

- Regions with higher rate of return;
- Classification of models with higher defect rate;
- Store classification;
- Classification of defects.

III. INITIAL PROPOSAL

For the development of the tool, visits were made to the company, when information was collected through interviews on the return process of the mobile devices, number of devices, time to return to the factory and periodicity in evaluating the data. During one of the visits, it was noticed that due to the accumulation of data, the person in charge of analyzing the data and generating reports spends a lot of time and effort to do this because they do it manually, and a management dashboard can be looked at as an executive tool whose sole purpose it to make information easier to read.

In the planning stage of this software, it was possible to determine the scope of work required and the best technologies for the development, to identify possible technical problems and to find solutions for them. For the development of this software was used Python and IDE PyCharm, consuming the Pandas library. This technology was selected due the consideration of the license and information sharing restrictions.

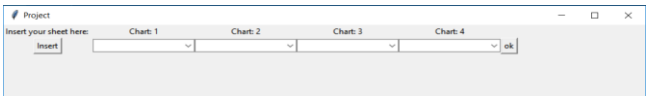

Figure. 2. Software Interface.

The tool has an interface in which the first step is the insertion of the worksheet (Figure 2). It must have the Comma-Separated Values (CSV) extension. The software reads the worksheet and displays the labels (the names of the first row), so the user selects the data to generate graphs (Figure 3).

The application sums up the values that have the most occurrences and displays the top five data (using Pandas library). These requirements were collected due to the need of the quality department as a strategy to analyze the quantity of devices.

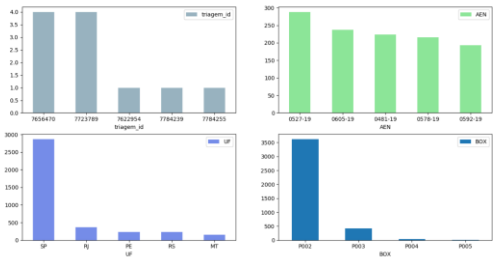

Figure 3. Graphs Generated by the Tool.

IV. PARTIAL RESULTS

The proposal was presented to the quality team and follows the main requirements to display graphs quickly and intuitively with predefined data. The software reads raw data and provides fields for the user to select information, making the tool customizable as needed. Previously, the data analyst needed to view the entire spreadsheet to collect the data. It has been set to display four different graphics with different colors and captions. Up to this work stage, the tool provides the sum of the data because the quality team needs to manage the total quantity. However, some improvements have been suggested, such as the customization of the graphics in which the user can choose the type of graph to be displayed. Another suggestion was to relate the columns; for example, select which models had the most defects and in which city. Another enhancement option was to add average calculation, display the top five values and the bottom five.

V. CONCLUSION

This work presented a tool designed to assist in data analysis in the Quality Department of a mobile device factory, thus providing the most relevant defect information. It also provides organized and personalized reading and visualization of data in graphical format optimizing information visualization and replacing manual analysis. For the next stage of this work, new functionalities will be developed an exploratory and applicability study of the tool in other departments or different areas.

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 ISBN: 978-1-61208-752-8