Journal of Positive School Psychology http://journalppw.com
2023, Vol. 7, No. 3, 608-614

Use Of Free Software To Carry Out Analysis Health Statistics, Which Come From Different Types Of Source Files

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Abstract. The new structuring of Zones, Districts and Circuits carried out by the Ecuadorian state has generated a centralization of information towards the 9 zones that the country has, which are being strengthened and consolidated in their different limits. However, the lack of applications that help analyze and process information to make timely and appropriate decisions at the right time is notorious.

The development of a (B.I) Business Intelligence free software as stipulated by the government policy, allows the processing and analysis of information in a fast, reliable and timely manner through the use of statistical techniques, for this there will be a base of indicators that will allow decisions to be made in the administrative and managerial part, the Business Intelligence system is aimed at the Directors of processes of the Zonal Health Coordinations who are in charge of making decisions so that Public Health is of quality and reaches all Ecuadorians .

The final product of the work will be a website that allows viewing statistical health indicators, extracted through a concentration, processing and analysis of information from all the first, second and third level operational units that each Zonal Health Coordination has.

Keywords: PostgreSQL, Data Warehouse, Pentaho.

1 Introduction

Currently, the structuring of Zones, Districts and Circuits carried out by the Ecuadorian state has generated a centralization of information towards the 9 zones that the country has in different environments, which has generated the need to have applications that are capable of concentrate information that is generated every day by thousands of users.

The data by itself lacks value, it must be cleaned and processed so that it can have consistency and give the added value that is necessary for any institution or company.

At present there are many data sources in a number of formats, to access the information in a structured and simple way, it is necessary to have a correct aggregation of the existing sources. In addition to these cases, it has been observed that the consolidated data does not have confidence, which decreases its quality.

The use of Free Software will help to concentrate the information from different source files that come from programs and projects efficiently in a single database.

2 State of the Art

At the Technical University of Cotopaxi there is a research work called "Implementation of a Data Warehouse, for the integral development department of the Municipality of Latacunga"

carried out by Verónica Cuchiparte. His main conclusion is that a Data Warehouse is a set of databases that have a different purpose to obtain priority information for different departments. This research helped to concentrate the information in a Data Warehouse and make it available to the different departments of the Municipality according to their needs, this Data Warehouse can serve as a base to form a Business Intelligent.

At the Polytechnic School of Chimborazo there is a thesis whose theme is "Study of business intelligence technology and its application in a model of management information system in Petroproduction." by Erika Paola Merino Logroño and Hugo Giovanny Vera Flores. Its main conclusion It is that all companies mostly have automated processes and systems that help their employees on a day-to-day basis, which is why it can be asserted that Business Intelligence (B.I) is one of the best solutions for companies in the public and private sector, Regarding data integration, analysis, consultation and exploitation of the same, this investigation served to determine that a B.I is the best way to concentrate information and determine the feasibility of using it in other models of the information system.

The integration betfween technological solutions, human resources, business processes in an integrated and interrelated system has allowed decisions to be made based on information management, research provides technical knowledge of intelligent business and the administration of public health institutions.

The application of intelligent business in the public health institutions of Colombia (IPS) has allowed to have an organizational culture where the generation of the same allows to obtain competitive advantages for a better service. LEMUS, (2005).

Statistical classification models are used daily in health as evaluation systems that allow the construction of homogeneous groups in the aid of prognoses, diagnoses, choice of therapies and any situation that requires discretization as a tool for making more accurate decisions. Their usefulness is not only evident in the medical field, but many of them help to improve actions and policies in the public health sector. As part of health technologies, they require continuous evaluation in the different scenarios where they are carried out. On the other hand, using them mechanically, without a critical mentality, can bring more risks than benefits, so their predictive or explanatory power does not justify that their results are used unquestioningly. GONZALES, (2014).

In the analysis of the problem to be addressed and its context, the open exchange between the members of the sanological team, especially between developers and sanologists, has been crucial. The informational interest is focused on determining the areas of healthy action to preferably address in the path of a person's health. Other questions that require a greater degree of elaboration correspond to discerning the areas of healing most frequently detected in a doctor's office in the last month; find patterns of correlation between the behavior of the members of a family, extracting similarities and differences; recognize trends in health promotion in a territory.

During the planning stage, the need to apply the sanological strategy as a starting point to have stored data that facilitates not only the direct interrelation of the sanologist and the person based on the individual health path, but also that favors obtaining information for collective action and, even, that in the course of time make possible investigations in communities or territories that favor wide-ranging decisions. GARCIA, (2012).

In Cuba, individual information was used for the construction of a B.I. that helped to obtain sanological indicators.

A study carried out in Europe by Information Builders Ibéric showed the cost of the lack of decision-making systems in organizations. According to these data, the average European employee loses an average of 67 minutes a day looking for company information, which is equivalent to to 15.9% of their working day. For an organization of 1,000 employees that earns around 50,000 euros a day, this is equivalent to 7.95 million euros a year of lost wages, all for the search

for information to make a decision. ZUMEL, (2008).

The study carried out in Europe serves to give us statistics on the time and resources that are lost when searching for non-centralized information, which allows us to focus on the construction of a B.I. for a growing sector such as Health.

3 Methodology

2.1. Diagnosis

It limited itself to knowing the causes for which the development of a business intelligence in free software is manifested, based on management indicators, until being able to propose possible solutions, as strategies for health coordination, which allow the development of the aforementioned variables. , allowing to identify specific elements and characteristics, on the research problem, where it allows to collect, compare, analyze the data obtained, ensuring better coordination.

2.2. Applied method(s)

Among the methods used for the development of the research were:

Analysis Synthesis

Through the analysis, it was possible to investigate the causes for the development of a business intelligence in free software, based on management indicators, for health coordination, to later return to the general problem and present the proposal in a Pentaho.

Inductive method

The inductive method was used to diagnose the current situation, in which the development of free software business intelligence predominates, based on management indicators, for health coordination, for the search and identification of solution strategies.

2.3. Materials and tools

The research was developed through a Qualitative-Quantitative research modality, because the first stage is a process of collecting and obtaining numerical data, through the application of predetermined formulas, to obtain percentages related to the development of a business. Intelligence in free software, based on management indicators.

The research is also qualitative, because it examines phenomena in great detail, without any category or predetermined hypothesis, this approach will allow us to determine the qualities for health coordination, which are subjected to the object of study, in order to understand and understand the relationship between the two variables, such as business intelligence in free software and management indicators.

4 Results

Kettle Data Integration

It is an application that facilitates the extraction and transformation procedure at the time of downloading Kettle in the registry, since to carry out the extraction process from a shelf, the command can only be executed through the following window.

The universe taken to be able to analyze and obtain data on the use of Business Intelligence in free software and the management indicators obtained, are the Directors of processes of a Zonal Health Coordination, who will be in charge of making decisions so that there is a complete satisfaction of the users of the national health system and will be the ones who manifest the use or not of Pentaho.

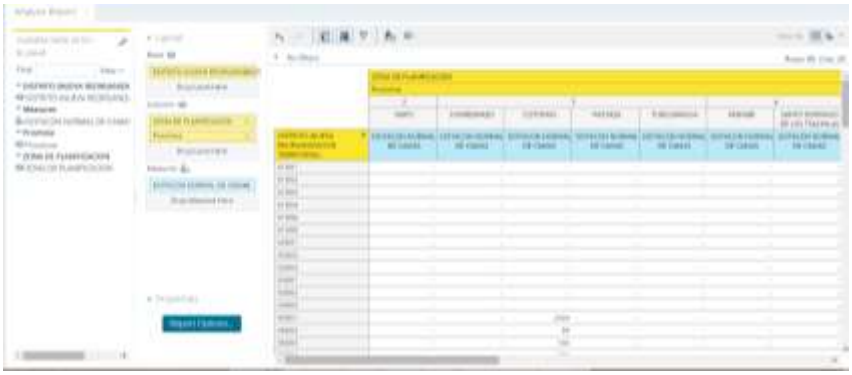
To consolidate a database, the collection and consolidation of data from the 300 health operating units was carried out, the process was carried out through the participation of the 19 districts that belong to the Zonal Coordination.

The data validation was carried out through two hierarchical filters, the zone review of one hundred operating units, for which there is a 92% reliability of the information with a margin of error of 8%.

To generate reports, enter the Analysis Report module, when entering this module another screen is displayed where you enter the type of connection

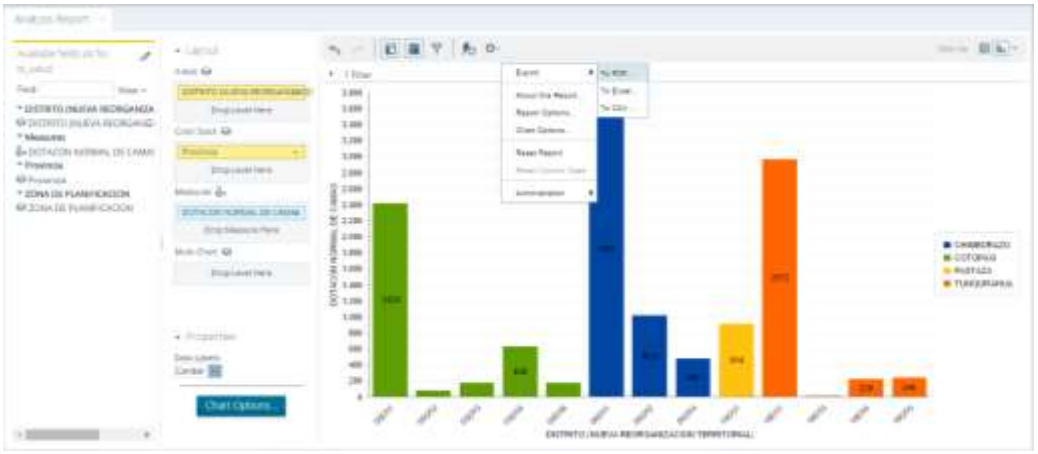
that is going to work, then the metrics (measurements) that will be useful for the generation of information tables that will be part of the generation of reports. The following figure illustrates the screen where this process is performed.

After that, Dimensions and Measurements are determined for the Generation of information cubes. The following graphic shows an example.

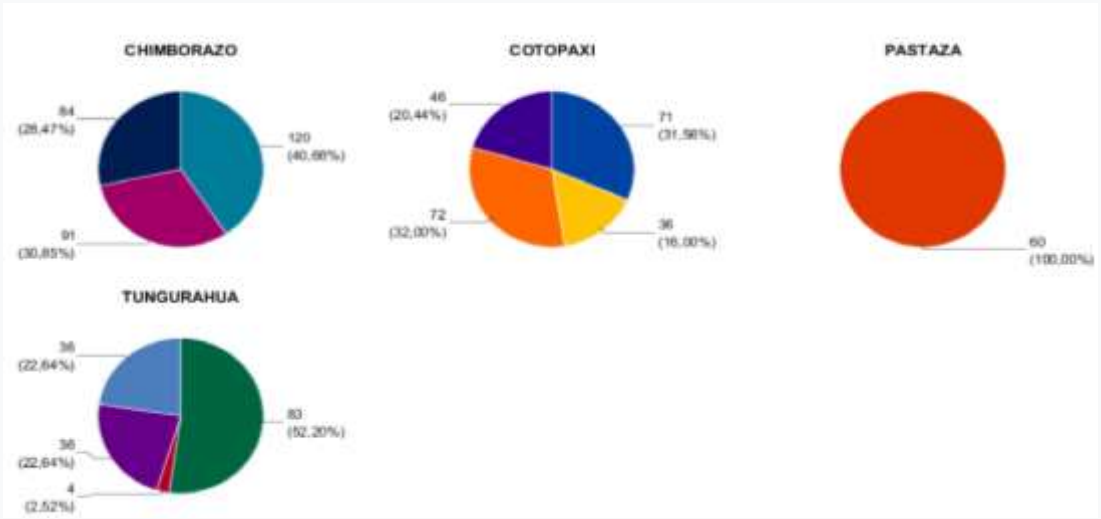


Generation of tables and graphs

When you want to generate tables and graphs, you must previously choose the Dimensions and Measures that will lead to obtaining queries made. To make a table, it is located in the fields column that is on the left side and the variables to be calculated are determined, then the chosen variables are dragged to where the Rows (rows) and Columns (columns) tabs are located. In Measure (measure) the variable to be estimated or on which all queries are going to work is defined. The table is formed automatically after having identified and transferred variables and measurements to the dialog window. The graph is formed by clicking on the image found at the top of the work console, where it is possible to choose the type of graph according to the characteristics of the variable to be represented. The graph below shows the generation of results.



Another way of visualizing the Registrations that correspond to a month, it is observed that the total number of registrations is 864 in the entire Zonal Coordination, with fewer registrations in the Province of Pastaza with 60 registrations and in the Province of Chimborazo there is the largest number of registrations. discharges that are 300, this allows them to consider if the number of discharges made is consistent with the amount of inputs used and with the number of doctors that the hospital has



Satisfaction Results

1. On what scale do you consider the development of free software business intelligence that is based on management indicators to be of great importance for health coordination?

Alternative	Frequency	Percentage
Very Good	2	67%
Good	1	33%
Regular	0	0
Total	**3**	**100%**

Analysis

Of the 3 departmental Directors surveyed, 2 consider the development of free software Business Intelligence based on management indicators to be of great importance, for a Zonal Health Coordination, which represents 67%, while the

other 1 state it is good, which represents 33%.

2. How do you consider the response time when making inquiries?

Alternative	Frequency	Percentage
High	2	67%
Half	1	33%
Low	0	0
Total	**3**	**100%**

Analysis

The 2 managers surveyed state that the response time when making inquiries is high, which represents 67%, while the other 1 state that it is medium and represents 33%.

3. At the time of making inquiries, the information obtained is adequate

Alternative	Frequency	Percentage
Yes	3	100%
No	0	0%
Total	**3**	**100%**

Analysis

The 3 people surveyed, indicate that at the time of making the consultations the information obtained is adequate, which represents 100%.

4. Consider the use of the Pentaho system easy

Alternative	Frequency	Percentage
Yes	3	100%
No	0	0%
Total	**3**	**100%**

Analysis

The 3 people surveyed consider that the use of the Pentaho system is easy, which represents 100%.

5. You believe that the Pentaho platform provides better solutions

Alternative	Frequency	Percentage
Yes	3	100%
No	0	0%
Total	**3**	**100%**

Analysis

All 3 people surveyed, if they believe that the Pentaho platform provides better solutions, which represents 100%.

5 Conclusions

A solid base of information was obtained from the

first, second and third level of care in the different services provided by the Ministry of Public Health, the information was verified through stratified random sampling and we can say that it is 98% reliable.

It was possible to define an information structure for Pentaho capable of managing data from a Zonal Health Coordination of different centers, subcenters, type A, B and C units, and General and Specialty Hospitals

An initial list of indicators considered according to the current need for a Zonal Health Coordination was built.

A Business Intelligent was built with Health information and under a free software such as Pentaho which through its various components allowed us to obtain health management indicators such as: References,
counter references, Preventive Coverage, Prenatal Control Coverage, Prenatal Control Concentration, endowment of beds, Total Expenses, Turn of Beds, Percentage Daily Patient days, Percentage of occupation, Daily percentage days discharged y deliveries.

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