DIGITAL DASHBOARD

THE COMMERCIAL MANAGER: New approach for decision-making

- Case study of SDCBLIDA (Electricity and Gas Distribution Company)-

رقمنة لوحة القيادة: نهج جديد لنظام صنع القرار: دراسة حالة لمؤسسة توزيع الكهرباء و الغاز للبليدة

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Abstract:

   Business intelligence establishment becomes the major axis of company steering and management. Collecting scattered data across the company is a fundamental function of the decision-making system. This data is stored in a data warehouse that is a cost-effective solution to face businesses needs in terms of knowledge capitalization and decision support.

ETL tools, "Extract Transform Load", are responsible for this delicate operation of the global decision-making system.

Due to the growing amount of information, needs changing and field specificity, the development of specific decision-making has become the essential solution. This paper discuss the implementation of "The Commercial Manager" as new tool of business intelligence which is developed by researcher for the Electricity and Gas distribution Company specially to the Commercial and Marketing Department "SDC-DCM-". This tool allowsextracting, filtering and analyzing data from various databases (around twenty directions) to a DCM datawarehouse. It also allows enriching the departments' information systems by perpetuating them and by improving at a time their reliability, scalability, security and especially their management and create a digital dashboard that contributes to making the right decisions when the company choose decisions.

Keywords: Business intelligence, Data warehouse, ETL, dashboard.

Jel Classification Codes : M15 ;O32 ; C80, M 10.

Abstract in Arabic:

أصبح موضوع ذكاء الأعمال المحور الرئيسي لتوجيه وإدارة الشركة، كما يعد جمع البيانات وظيفة أساسية لنظام صنع القرار. يتم تخزين هذه البيانات في مستودع البيانات وهو حل فعال من حيث التكلفة لمواجهة احتياجات الشركات من حيث جودة المعرفة ودعم اتخاذ القرار.

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الاداة ETL، "استخراج، نقل ،تحميل" مسؤولة عن هذه العملية الدقيقة في نظام صنع القرار نظرًا للكم المتزايد من المعلومات ، والاحتياجات المتغيرة والخصوصية الميدانية اين أصبح تطوير عملية صنع اتخاد القرار الحل الأساسي.

تناقش هذه الورقة دور نظام المعلومات "Commercial Manager" كأداة لذكاء الأعمال والتي قمنا بتطويرها لشركة توزيع الكهرباء والغاز خصيصا لقسم التجارة والتسويق "SDC–DCM–". يتيح هذاالنظام استخراج البيانات وتصفيتها وتحليلها من قواعد بيانات مختلفة (ل20 مديرية تابعة لها عبر الوطن)،تخزن هذه الأخيرة فيمستودع بيانات Data warehouse رئيسيحيثسمح هذا النظام بتزويد المديرية بنظام للمعلومات يسمح في نفس الوقت باستدامة المعلومة وتحسين موثوقيتها وقابليتها للتوسع و أمنها وخاصة إدارتها و استعمالها لإنشاء لوحة قيادة رقمية تساهم في اتخاذ القرارات الصحيحة.

الكلمات المفتاحية: لوحة القيادة، مستودع البيانات، رقمنة الأعمال.

تصنيفات JEL: M15, O32, C80, M10.

Introduction:

The company performance control is one of the crucial aspects of company management, in small or tiny companies it seems simple but in large one (which contain tens of departments, thousands of employees) problems begin. So we ask many questions: what to do? Is it possible to control the whole company? The main answer is "using technology" which means using business intelligence in management.

While Business intelligence is a natural outgrowth of a series of previous systems (decision support, executive information systems, and management information systems) (**Thomsen, 2003,pp; 21- 25**) designed to support decision making, we believe that business intelligence can play a key role in enabling the company to make a good decision as well as to improve the management control by improving reporting process.

The emergence of the data warehouse as a repository increase capabilities of hardware and software and create a richer business intelligence environment than was available previously.AlsoETLis the integration layer in Data Warehousing environment which in turn pulls data from several sources by applying complex transformation to them.

 Despite BI dashboards provide many advantages over paper reports furthermore the easy of reporting and the dynamism of reporting, most importantly, they provide decision-makers and fiduciaries with data, where, when and how they need it. However, in order to show how digital dashboard as a new approachnamed "commercial manager" which is developed by researcher can serve as a basis for reporting and supporting decision-making.

Based on the above, we can summarize the problem of this study in the main following questions:

What are the proper tools to implement the BI dashboard? And how can this new approach enhance the quality of decision-making and the reporting process in BLIDA'SElectricity

and Gas distribution Company (The Commercial and Marketing Department "SDC-DCM-")?

1- conceptual framework of business intelligence

Business intelligence gives to all size companies the ability to extract\ report on essential information out of mounds of data and to use this information to make effective business decisions (DANIEL&Dinu,2011, P: 1232).

1-1 Business intelligence definitions:

BIis defined as a broad set of applications, technologies and knowledge for gathering and analyzing data for helping users make better business decisions.

It is also described as a set of concepts and methods to improve business decision making by using Fact-based support systems. (DANIEL&Dinu,2011, P: 1232)..

The BI produces analysis and provides in depth knowledge about performance indicators such as company's customers, competitors, economic environment and internal operations to help making effective business decisions.

Essential components of proactive BI are (Langseth, J. and N. Vivatrat ,2003,PP. 34-41.):

• Real-time data warehousing,

• Data mining,

 • Automated anomaly and exception detection,

 • Proactive alerting with automatic recipient determination,

 • Seamless follow-through workflow,

 • Automatic learning and refinement,

 • Geographic information systems

• Data visualization.

BI assists in strategic and operational decision making: the strategic use of BI are ranked in the following order :(Willen, C.,2002, pp. 11-12)

✓ Corporate performance management
✓ Optimizing customer relations, monitoring business activity, and traditional decision support
✓ Packaged standalone BI applications for specific operations or strategies
✓ Management reporting of business intelligence.

BI converts data into useful information and, through human analysis, into knowledge. Some of the tasks performed by BI are:

• Creating forecasts based on historical data, past and current performance, and estimates of the direction in which the future will go.

 • "What if" analysis of the impacts of changes and alternative scenarios.

 • Ad hoc access to the data to answer specific, non-routine questions.

• Strategic insight

1-2 Business intelligence tools:

1-2-1   <u>Dashboard</u>: it is one from several types of BI reporting. Dashboard is a visual display of the most important information needed to achieve one or more objectives, consolidated and arranged in a single screen, so that information can be monitored at a glance. (Stephen Few, 2004)

A BI dashboard provides all critical information needed to run a business. A good dashboard system includes at least the following features: (Cantor, D., 2016).

- ✓ Provides a central repository for information collection
- ✓ Has a controlled environment so that accuracy is maintained
- ✓ Produces and monitors output automatically using real-time data
- ✓ Makes use of graphs and charts to display output in an easy-to-interpret manner
- ✓ Enables a variety of users to access similar information
- ✓ Allows for drill-down into the results
- ✓ Is easy to access

1-2-2   EXTRACTION, TRANSFORMATION AND LOAD:

ETL is the process to allow their data moving it from source data to datawarehouse. The data can be taken from any source. The testing of ETL process is mainly dealing with how and where we carry in our database.

ETL involves three stages of data handling: Extraction, Transformation and Loading. The three steps are combined into one tool that the process is to pull data to one database to another database. The first stage isExtraction that is responsible for connecting the various data sources and extracting the data relevant for analysis and research. The difficulty in extraction is the existence of heterogeneous data sources that need different approaches for connecting and extracting. ETL requires specific tools to deal with heterogeneous data sources. The second stage is Transformation, in which the extracted data are transformed to a specific format based on rules, functions and conditions in preparation for the next stage. The second stage ensures that the data are integrated and consolidated to facilitate the final stage. In the final stage, the data are transformed into dimensional forms and loaded into DW tables with star or snowflake schemas.(Alaa Khalaf Hamoud & all. 2018 pp:2-3)

The ETL tools are created to improve and facilitate data warehousing. The motivation of using ETL tools is to save the time and make the process more reliable. (Nataraj& all, 2018, pp: 1621, 1622)

The ETL process consists of following 10 steps:

- ✓ Initiation of process
- ✓ Build the reference data
- ✓ Extract from different sources
- ✓ Validate process
- ✓ Transform the data
- ✓ Load into stages
- ✓ Reports
- ✓ Publish data

- ✓ Archive data
- ✓ Clean up

Benefits of an ETL tool:

- ✓ Simplify the migrating data
- ✓ Store all the data (logic/rules as metadata)
- ✓ Reduce the cost and Time
- ✓ Easy to understand, modify the various interfaces.

1-2-3 Data warehouse:

DW is one of the most important platforms that help managers in various disciplines make decisions. Data in the DW are integrated and modelled in multidimensional form, thereby making visualization and analysis fast and easy (Chaudhuri, S. and U. Dayal, 1997,pp: 65-74). The types of data stored in DW should enable stakeholders and institutions to obtain high quality results that support critical decisions (Jaber, M.M., et all, 2015, p: 349). The DW processes data from operational data storage systems. This process requires tools and hardware components to ensure safe storage and efficient analysis of large data that institutions, organizations, researchers and others need in making strategic and operational decisions. The DW is not only an instrument used in transferring data but is also a tool in consolidating, analyzing, querying and presenting information. The success of DW in many fields has encouraged clinical institutions to adopt it as a platform for research, management, analysis and decision-making (Shin, S.-Y., W.S. Kim, and J.-H. Lee, 2014: p. 109-116)
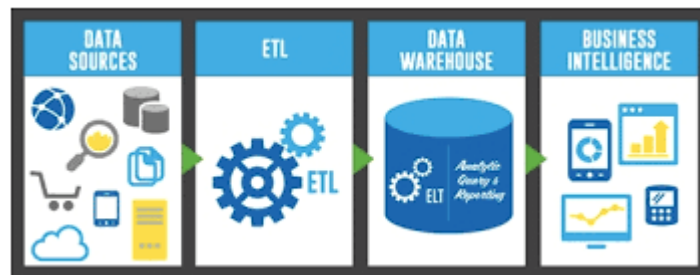

FIG. 1- relationship between Data source, ETL, Datawerhouse, Busniss intelligence

2- Business intelligence as support for business decision: "Commercial Manager" as new approach- Case study:

One of the characteristics of the company lies in a necessity to know how to exploit –by the best way- the new possibilities offered by business intelligence. Indeed, while considerable mass of information managed by organizations' information systems, we must now add this accessible via a single "Data Warehouse".

view the difficulty of exploiting the information received by the "DCM" Commercial and Marketing Department due to the mass of information, their heterogeneity of sources and their structure, so it became necessary, even essential, to have integration tools to make useful information accessible by allowing them to be manipulated and analyzed. These are the main objectives of data warehouses [1].

The DCM currently gathers 20 distribution departments (DD)(Oran .Essenia,Tlemcen,Relizane,Bechar,Tissemsilt,Adrar,Tindouf, Mascara, Ain Temouchen, Ain Defla,Chlef,Chlefnord , El bayadh,Mostaganem,Naama,Saida, Sidi Bel-abbes,Tiaret)

to respond at the best time to the needs of commercial departments in terms of analysis, control and decision-making, the DCM establishes a control by the creation of a monthly dashboard including commercial results of the 20 DD detailed by type of subscriber (OS: Ordinary Subscriber,LV: Low voltage,LP: Low Pressure, MV: medium Voltage MP: Medium pressure, HT: High Voltage, HP: High Pressure), turnover, number of subscribers, sale of electricity;purchase of electricity; customer debt.

2-1Old Architecture

The dashboard at DCM level is established according to the following steps:

First: Information gathering: The DCM reminds the DDs monthly for sending information according to a precise canvas, the reception of the 20 DDs files is done by messaging or by fax.

Second: Data transformation: the responsible of studies re-enters the data in their monthly file then after a consolidation of all the data of the 20 DDs, a recalculation of the indicators is carried out.

Third: Presentation of the finaldashboard state: a copy of all tables of commercial indicators are pasted into a power point file in order to present it to the director of DCM.

This working architecture has recognized several problems we can cite:

• Data entry errors,

• Lack of respect for deadlines of information transmission by directions can cause considerable delays in reminders.

• Risk of calculation errors,

• Information are sometimes incomplete and inconsistent,

• Time allocated to validation and analysis very insufficient,

• Difficulties to get specific information to refine the analysis,

• Difficulties responding to deadlines for occasional requests for occasional information internally and externally,

• Calculation rules are not unified,

• Risk of data loss.

2-2Design process for the new architecture

Due to the problems met by manager in charge of studies of the commercial and marketing department of the SDC, we are developing a new decision-making system called "Commercial manager". This system is used to automate the dashboard for better information efficiency in a brief delay.

The decisional tools are based on the operation of a decision-making information system powered by the extraction of various data from company data and information.

As mentioned above , an ETL (Extract, Transform and Load) tool is responsible for extracting data from different sources, filtering it and loading it into a data warehouse. their advantage lies in :

- ✓ Integration: aims to solve the problems of heterogeneity (models, formats and semantics of data, systems, etc.) of the different data sources by integrating them into a global source. The data used for the decision remains stored in their data sources and is only extracted at the time of warehouse updates.
- ✓ The construction: consists in extracting the data relevant for decision-making, then in copying them in the data warehouse, while preserving, if necessary, the changes of states of the data. The data warehouse constitutes a centralized collection of data and their histories (conservation of evolutions).
- ✓ The structuring: reorganizes the data in data warehouses for more efficient interrogation and analysis processes. BDD SGC Database of the Customer Management System from where each direction has its own BDD.

2-3 New Architecture

This new architecture for building a data warehouse and developing business Intelligence system allows us to automate all the stages of the old architecture
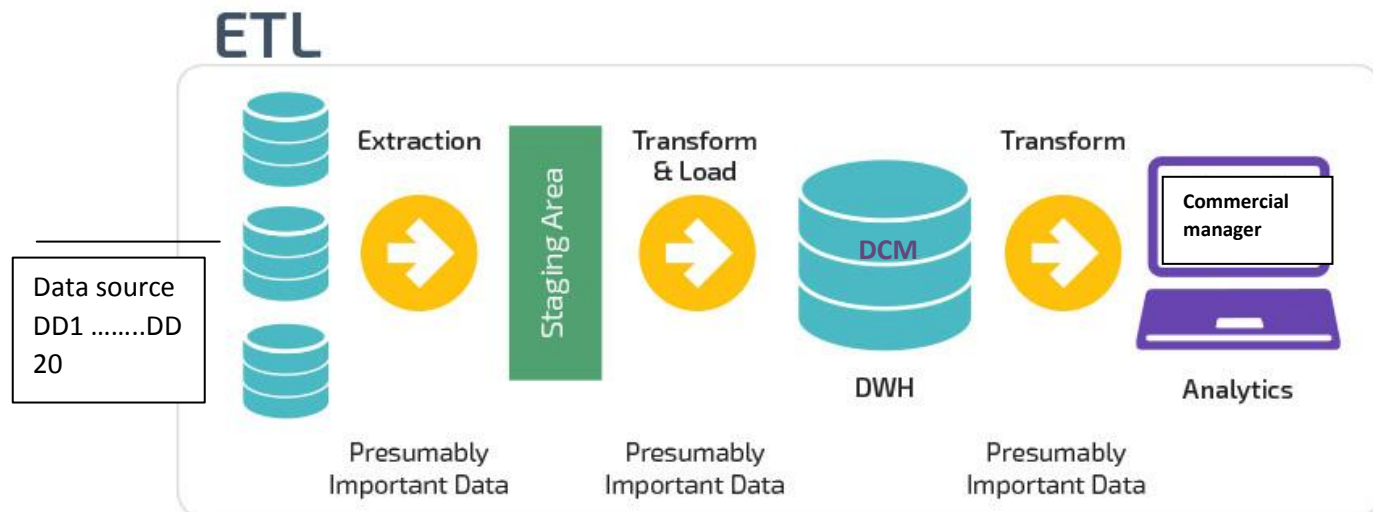

FIG. 2- Data warehouse design process

A -**Extraction:**

By The commercial managersystem, the access to the databases of the 20 departments is via a secure and specialized network.Sothe manager with a single click on the direction chosen can make the data be loaded into the data warehouse for only the information requested to establish the dashboard.

B –**Transformation**

- We have transformed the data extracted according to the fields of the tables created in the data warehouse of the commercial manager, a conceptual model is defined in order to organize the information extracted.

- Make the data from different sources coherent by transforming, cleaning (filtering) and sorting data. For example unify the date format (MM / DD / YY _DD / MM / YY)

C **-Loading**:

• Retrieval and insertion of the extracted data and transform in the warehouse tables of the sales and marketing department. All the data are loaded and organized according to a logical data model to facilitate their use
•three-dimensional modeling: a three-dimensional modeling is used because each ego the DCM direction needs information according to three parameters name direction, period, management parameter) example: (Distribution direction example Chlef, time example April and parameter management example energy sales). The calculations are made after loading the cube
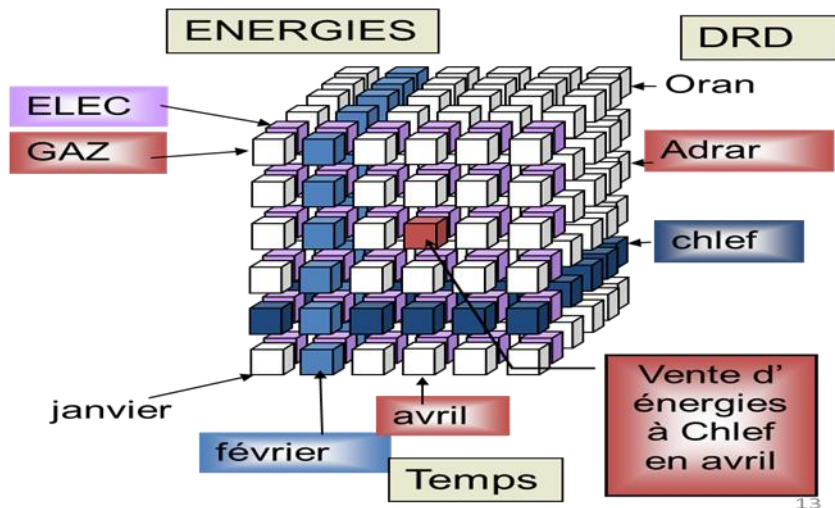

FIG 2. - Presentation of the data in the form of a Cube

2-4COMMRECIAL MANAGER reporting results (presentation of exit reports):

the commercial manager reporting respects the canvas of the manual dashboard to facilitate the use of the system and to facilitate the work of the research managers; this system makes it possible to print all the data in the form of output reports which can be transform into an Excel for unreported needs; the states are distributed by module each module has all the periodic and cumulative information; by direction, and by subscriber type

1-Subscriber module:

1-1-Subscriber contribution and number (Electricity and gas): the system automatically calculates the number of new integrated customers During the period chosen by the manager for different types of customer (AO, BT and BP, MT and MP, HT and HP)

1-2-The total number of subscribers: presents the total number of customers existing by direction and by type of subscriber then it automatically calculates the number of subscribers of the general management

2-Electricity purchase and sale module:

2-1Purchase: the purchase sub-module does not exist the information in the BDD of the DD for that we developed an interface to enter the data coming from the accounting department to keep the information and for a better traceability of the information in order calculate the loss rate automatically

2-2 Sale of electricity and gaz: the system makes it possible to extract information from the source after the billing has been entered on a monthly basis, this sub-module presents very reliable and exact information on different sales by type of subscriber and by direction; periodic and cumulative

2-3 loss rate calculation: the system automatically calculates the loss rate from the previous two sub-modules.

3-Electricity and gas energy turnover:

The system allows to extract the efficient information for the calculation of the turnover of the company; after the development of this interface, We detected differences with some directions, the latter found that they used a rule of erroneous calculation, these among the advantages of this system which made it possible to unify the calculation rules of the 20 directions

The information is extracted after the validation of the R50 (monthly billing accounting) is that the system displays the exact information in KDA by different subscriber type and by Periodic and cumulative Direction

4- module Status of receipts:

This module made it possible to present 3 sub-modules extracted from different BDDs, the balance of receipts per month; by nature of the receivables and by commercial direction (agency) and an interface for entering work which is not included in the customer management system of directions

debt recovery: this module has recognized several problems since each direction stops the amount of recovery according to a date which chooses; after the adaptation of this module in the system the latter allows to extract the amount of collection of debts by me ie from the first of the ego to the end of the ego which allowed to unify the information

5-billing module for own use:

The system presents very reliable information identifying its own detailed usage and by direction; periodic and cumulative

6-module analysis

For the needs of the sales management audit team; the team has to present these information needs for control and analysis of the situation of the different sales management (agency), for this an automatic extraction of the desired information is carried out with output states to facilitate control on the ground

the following image is used to represent the exit states such as: the turnover states in detail; the states of billing for own use, the states of energy purchases. the states of the number of subscribers in detail…

2-5 the advantages of the commercial manager application:

• Save time devoted to the analysis and consolidation of the figures,

• More consistency of data;

• Automation of the dashboard;

• Independence regarding of informationcollection ;

• Use of the accounting source;

• Traceability and archiving;

• The provision of a management tool;

• following up the evolution of energy sales and turnover carried out by each Distribution Department;

• Analysis of the receivables portfolio while taking into account the age and weight of the receivables as well as the evolution from one period to another;

• Establishing the dashboard at the end of each month;

• Calculation of the rate of loss of energy sales per month;

• For each period, define a statement on the evolution of the balance of the different portfolios by client category.

▪ **Comparison of the new and old architecture**

Dashboard operations	Old Architecture	New Architecture
Data source	Fax. messaging	BDD in real time
Calculation rules	Not unify	Unify (automatic calculation)
Collection of data	30 jours	30 mn
Data entry	Daily	automatic
Calculation operations	Risk of errors	automatic
Data consolidation in a single dashboard	Consolidate the data of 20 DD for each commercial indicator then reconstruct a global dashboard	Automatic respecting the patterns
Back up data	As a file, risk of virus or update of files	Automatic in a data warehouse whose saved in a secure server

Dashboard presentation	Excel tables are copied into a power point file	In the form of exit states can be transformed to many forme More than one web link facilitates access to the door at which time with a last update of information

Conclusion

Digital Dashboard is used to harmonize the behavior of individuals around a common system of representation of individual and collective performance.
They show that local leaders and managers save time and follow their goals more regularly

We proposed and realized an architecture for decision support systems, based on the approach of data warehouses and distinguishing different research issues. This article studies more particularly the central element of our architecture: the data warehouse as well as the ETL tool. After presenting the old architecture with a reminder of its main drawbacks

Problem	Solution (by the commercial manager system)
Information gathering	Information is automatically extracted from source to DCM's datawerhouse
Data transformation	The data is loaded and presented in the form of modules in the application while respecting the canvas of the dashboard
Presentation of the final state of the dashboard	Output reports allows you to print all the desired reports We have developed an HTML interface to facilitate the hierarchy and staff of DCM to access information about when and when

With regard to the consistency of representation, we have tried to show the links between the automation of dashboards and consistency with management control. The results show that automated dashboards effectively contribute to providing stakeholders with a more complete and reliable data system, data is provided more frequently and, overall, the essential information and datadecision-making are present. as it offers the manager the possibility of self-control and thus

helps them achieve their strategic objectives. Many executives of organizations confirmed that the automated dashboard system had allowed them to better integrate operational improvements into the overall strategy of the organization, more analysis time than loss of information accumulation time.

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