THE ROLE OF SAP BUSINESS OBJECT TO SUPPORT A BUSINESS INTELLIGENCE PERFORMANCE

Eileen Fransisca Abadi[1*], Aleksandar Terziev[2], Alexander Setiawan[3]
[1] Business Information System – Petra Christian University Surabaya
[1] Information Communication & Technology – Business, Fontys University of Applied Sciences, Surabaya, Indonesia – Amsterdam, The Netherlands.
[2] Analyst Operation, Fontys University of Applied Sciences
[3] Informatics Department, Faculty of Industrial Technology Petra Christian University Surabaya
Email: Eileen.liem@live.com[1], Aleksandar.terziev@tipeurope.com[2], alexander@petra.ac.id[3]
[*] Korespondensi penulis

Abstract: As the world of information and communication technology grows, it is becoming increasingly important for the role of technology as the primary information processor in every line of human life today. It can be concluded that the current role of technology has evolved into needs, not just corporate or academic interests. This creates the birth of a new economy marked by the high penetration of the use of IT (Information Technology) in the business transaction process, so the concept evolves into a smart business, thus improving business performance. So the concept of SAP Business Object to be applied this can help improve the company's performance to continue to innovate on an ongoing basis.

Keywords: SAP Business Object; Business Intelligence; Suppor.

INTRODUCTION

Business Intelligence (BI) describes a system and set of data to transform into useful information for the purpose of business analysis. Business intelligence technology can handle unstructured data in large numbers to help identify, develop a system, and create a new business strategy.

The purpose of Business intelligence is to interpreted the large amount of data, perform identification of data, and implement an effective strategy based on competitive business and long-term stability.

Business intelligence technology provides predictions of business operations. Common functions of Business intelligence technology are reporting, analytical processing, data mining, process excavation, business performance management, measurement, analytical predictive and analytical prescriptive.

Business intelligence can be used to support a large number of business decisions ranging from operations to strategic. Operating decisions include product placements and prices. Strategic decisions include priorities, goals and directions at a broader level. This research was initiated by Business Intelligence Department at TIP Trailer Services. Where TIP Trailer Services is engaged in the purchase, lease, sale and rental of all types of trucks. The BI department is responsible for providing information such as operational reports. Operational reports, sent to analysts and other departments for analysis purposes, are sent periodically. BI is more effective when combined with data obtained from the market where the company operates (external data) with data from internal sources of the company's business such as operating and financial data (internal data).

This research was initiated by an organization TIP Trailer Services. Where the TIP Trailer Services is a transportation company engaged in leasing and rental of trailers, tanker rentals and rentals, maintenance and repair services, tire management, damage repair, fleet management, technology and telematics, fleet optimization consultancy, trailer sales and assistance at the edge Street.

TIP Trailer Services has business application called SAP Business Object which is used for distributing the Operational reports periodically. Operational reports are reports contain update information regarding on operational activities in the company such as report regarding on company's physical inventories. For example, Physical Inventory report is a weekly reporting which contains the last three weeks' amount of company's inventories.

Therefore, TIP Trailer Services is on the process of moving into the new application called INFOR. INFOR is a huge application which contains several cubes like Finance, HR, Units, etc. Cube, a term to describe multidimensional report structure in INFOR, is a data warehouse which contains fields of data to generate reports. The reports can be produced by connecting the database with the new application. INFOR contains all the raw data and has the ability to make reports just in a few clicks.

Currently, The BI Department uses SAP Business Object and TIP Libraries to produce and distribute the operational reports. SAP Business Object is an application which used for refreshing the operational reports for the current data while TIP Libraries is a storage system which used for archiving all the operational reports. The BI Department will send an

email, which contains brief summary and a link to the TIP Libraries, for a particular report to whomever it may concern. However, The BI Department considers these steps are time consuming. The BI Department needs to have an application which can be used not only to produce real time operational reports but also stored the old reports. Therefore, BI Department needs to move all the operational reports from SAP Business Object to INFOR BI.

INFOR BI is an application, which connects directly to the database, and has the abilities to make reports and dashboards. INFOR BI is now on building process. 50% of the whole operational reports have been automated on INFOR BI. The assignment is to move all reports regarding the maintenance and repair services reports to the M&R Cube. Maintenance and repair services reports contain data about all the maintenance and repair services which are done by company. In order to have all the maintenance and repair services reports in the INFOR BI application, a cube which contains the data need to be built in the INFOR database. Cube is a term to describe the multidimensional relation between the tables in the database. Thus, Operational reports in INFOR BI will increase by 20%.

BUSINESS INTELLIGENCE

The accessibility of business intelligence data is increasing rapidly due to data storage and low cost, which allows data to be accessed by many different people. The development of business intelligence has opened new insights into the company how to pattern the most effective data set between application domains, data storage, available technology, and analytical methodology to achieve business performance optimization. BI combines existing data, performs analytical tools, research methodologies, and new information provided from data, with business knowledge, and targets into periodic decision-making processes. [1].

In BI there is a basic definition that reflects a BI data as a general term combining a data architecture, tools, databases, analytical tools, applications, and methodologies. [2]. The main purpose of BI is to incorporate several different data sources into an information about the process at the company and provide this information in a timely and accurate manner to the management of the company. Information is based on analysis of operational data of the company and serves as a basis for tactical and strategic decisions for the future of the company. As a source for proper analysis. Thus as the main source system that can provide services in enterprise information systems such as ERP (Enterprise Resource Planning), CRM (Customer Relationship Management), or SCM (Supply Chain Management), as well

as complementary data from personal resources or external data can be used. The purpose of this contribution is to summarize the idea and give a positive impact and the BI approach and present the way in which small business BI objects can be built thoroughly [2].

The creating BI applications requires a high price for BI tools, so difficult implementation and complex implementation is the reason why small and medium businesses are looking for their own solutions. [3]. The next parts of the article show that usage of BI among small and medium enterprises is going to increase in the future as software vendors start to focus on this market segment and current technological trends are disposed to be used in small business environment as well.

SUPPORTING BUSINESS INTELLIGENCE

Current Situation

Currently, TIP Trailer Services has two applications, SAP Business Object and TIP Libraries, which uses to produce and distribute the operational reports. SAP Business Object, which is an application, is used to produce the Operational reports. SAP Business Object is connected to the SAFARI database. TIP Libraries, which is a storage or document management, is used to archive the operational reports file. TIP Libraries contains all the operational reports since 2009.

Operational reports are reports which being sent out periodically to the analysts and other departments for analysis purposes. Operational reports contain information regarding on TIP businesses such as how many expenses had been spent during the previous month. Operational reports are sent to the analysts for analysis purposes. One of the operational reports which in the future can be produced from M&R Cube is maintenance cost tracker. Maintenance cost tracker is a daily and monthly reporting. Maintenance cost tracker contains the data on how much income and expenses come from TIP Businesses regarding on its maintenance and repair services. The current reporting Process in TIP Trailer Services can be seen Fig 1.

Fig 1. The current reporting process in TIP Trailer Services
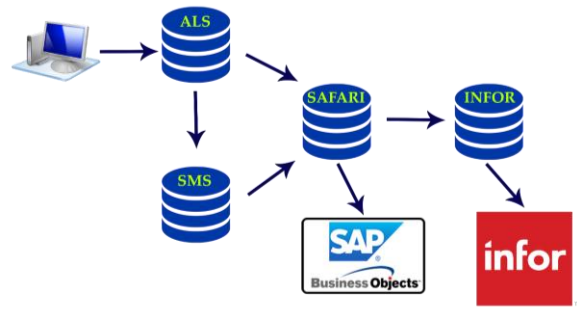
Problem Description

The problem in the current situation is the ineffectiveness of reporting process. The current reporting process really need to involve a person who must spent some time in order to make the report ready to be sent out to the analysts. The time spent on producing operational reports depends on its complexity. Daily operational reports usually take around 45 minutes, weekly operational reports usually take around 90 minutes and monthly operational reports usually take around 240 minutes. For the maintenance and repair services, there are 2 daily reports, 5 weekly reports, and 12 monthly reports. The calculations are explained in the fig 2.

Type	Total Reports	Hours to complete / each	Total hours / month
Daily	2	0,75	33
Weekly	5	1,5	30
Monthly	12	4	48
Total			111

Fig 2. Estimated hours use to produce the operational reports regarding the maintenance and repair services

The Goal of Business Object

The goal of business object operational reports regarding on maintenance and repair services from the SAP Business Object to INFOR BI. The fig. 3 was illustrated the data flow from the system used by TIP Trailer Services to the databases and applications which produce the operational reports. TIP Trailer Services has sources data which come from the system used by their workshops and goes to the ALS database. The ALS database contains each transaction in detail. The Finance department uses the ALS database to populate the SMS database. The SMS database contains only the summary of each transacttion. The data in the SMS database only used to produce financial reporting. SAP Business Object is connected to SAFARI databases while INFOR BI is connected to INFOR databases. SAFARI databases has been used since years and contained all the historical data which really important to TIP Trailer Services. INFOR database is made because INFOR BI application has feature which can directly write back to the database and TIP Trailer Services does not want any changes happened to the historical data. There will be no new inputs in the INFOR database. All the data in the INFOR database are directly come from SAFARI database. The data in the INFOR database had been filtered and selected using queries which depend on the requirements of the cube.

Fig 3. The data flow from the system to the databases and applications in TIP Trailer Services

BUSINESS INTELLIGENCE DESIGN

SAP Business Object is used by TIP Trailer Services to generate operational reports. However, TIP Trailer Services wants to move all reports to the BI INFOR application. The design of this BI is to move all reports on service maintenance and repair of SAP Business Object to BI INFOR application by building M & R Cube. The Cube, used in the INFOR application of BI, is a multidimensional link between tables in a database. In order to have an M & R Cube in the BI INFOR application, the M & R Cube table needs to be built in the INFOR database. In the conceptual data model [4] consists of 17 tables that are interconnected with each other, while there are 2 table stand-alone tables that support table and main table. The Conceptual Data Model can be seen Fig 4.

On the Fig 4, it shows where the data in the M&R Cube originated. M&R Cube is contained the data mainly from the work order header, purchase order header, rebills, and invoices tables. The work order table is contained the work which are done by the company such as the services regardless customers who have contracts or unrestricted customer. The purchase order table is contained all the transactions which are done by the company such as buying parts of the trailers (lamps, bolts, screws, etc.). Rebills table is contained the data of the cost of the works which is not covered on the contract. So rebills will not happened to the unrestricted customer.

Process

TIP Trailer Services has an integrated system which means that all the data which come from the system are directly stored in the databases. In order to produce the operational reports in SAP Business Object, the SAFARI database need to be connected to SAP Business Object. In the SAP Business Object, the BI department has built the operational reports by selecting particular tables in the SAFARI database and applying some filters. The current operational
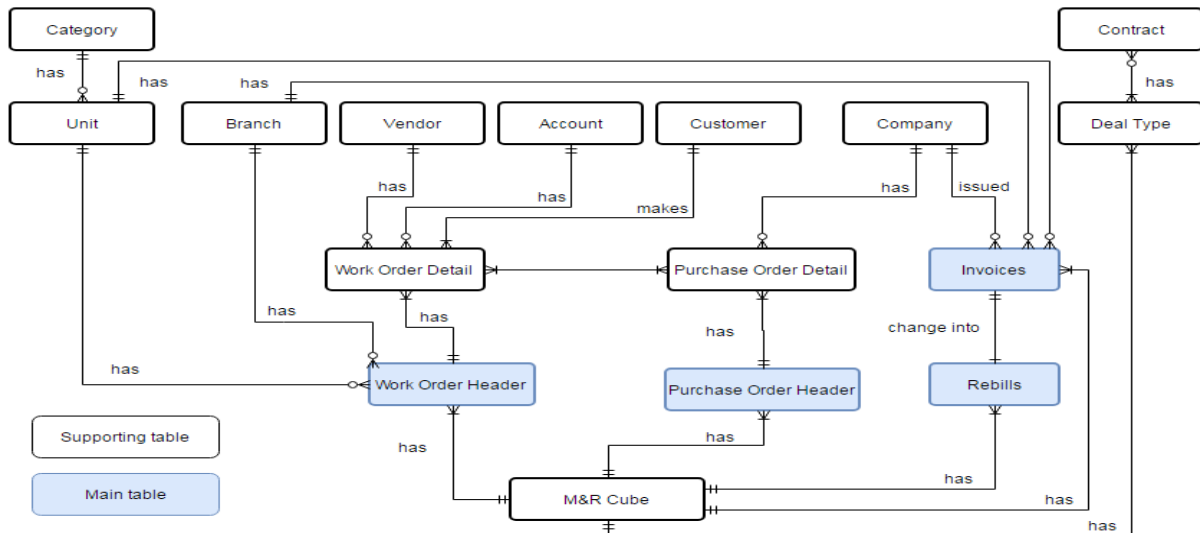
Fig 4. The Conceptual Data Model Process in TIP Trailer Services

reports require a person who spends some time in order to make the reports ready to be sent out to the analysts and other departments. In order to produce a particular operational report, the report in the SAP Business Object has to be refreshed for the current time. Afterwards, the updated report need to be exported in the form of excel file. Then, the person make a summary of the particular reports in order to make it readable for first rough analysis and upload the exported files in the TIP Libraries.

Afterwards, that person need to send an email contains of brief summary and a link to TIP Libraries for a particular report to the analysts and also to whomever it may concern. In case the analysts or people who received the email need the detail report files, they can access TIP Libraries and directly downloaded the file they needed.

The BI Department considers these steps of producing reports as a time consuming due to the data of each operational report in the SAP Business Object need to be done manually by a particular person such as refreshed the report in the SAP Business Object, exported the files in the excel form, made into summary, uploaded into TIP Libraries, and send it by email. That becomes the main reason for the BI Department to look for another application. An application which can streamline the reporting processes. The BI Department chose INFOR BI.

INFOR BI, which is an application, has the abilities make reports and dashboards by connecting the INFOR database with the INFOR BI application. INFOR BI application can produce reports and dashboards. All users have the access to the INFOR BI. In the INFOR BI, there are 50% of the operational reports which has been produced and accessible by the users. The advantages by using this application are

there is no longer need to distribute reports' summary and to archive reports' files. Users can select the report and change the selection of the filter as they want without destructing the original report. The report also able to display the historical data due to the application is directly connected with the database. In addition, there are 111 man-hours will be saved by moving of the operational reports from the SAP Business Object to the INFOR BI.

There are two daily reports, five weekly reports and 12 monthly reports regarding on the maintenance and repair services. Total man-hours are the estimated hours spend on producing the type of report. In order to complete a daily operational report usually takes around 0.75 hours while a weekly report usually takes around 1.5 hours. A monthly report requires a longer time to finish due to larger data compare to the daily and weekly reports. It takes around 4 hours per report. For the daily reports, the 33 hours are calculated by the total days of the month which are 22 days (in assumption if a month has 30 days which is minus by 8 days which are weekend) times by the total reports and hours to complete. For the weekly reports, 30 hours are calculated by the total weeks of the month (in assumption 4 weeks a month) times by the total reports and the total hours to complete. For the monthly reports, 48 hours are calculated by total reports times total hours to complete. The figure above tells that by moving the operational reports regarding on maintenance and repair services from the SAP Business Object to the INFOR BI, the BI team will be saving in total an estimated of 111 hours each month.

TIP Trailer Services has sources data which come from the system used by their workshops and goes to the ALS database. The ALS database contains

each transaction in detail. The Finance department uses the ALS database to populate the SMS database. The SMS database contains only the summary of each transaction. The data in the SMS database only used to produce financial reporting. SAP Business Object is connected to SAFARI databases while INFOR BI is connected to INFOR databases. SAFARI databases has been used since years and contained all the historical data which really important to TIP Trailer Services. INFOR database is made because INFOR BI application has feature which can directly write back to the database and TIP Trailer Services does not want any changes happened to the historical data. There will be no new inputs in the INFOR database. All the data in the INFOR database are directly come from SAFARI database. The data in the INFOR database had been filtered and selected using queries which depend on the requirements of the cube.

Those three types of data model are used as different purposes. Conceptual data model is used for business purposes. The logical data model [5] is considered as an initial step to build the physical data model. Physical data model is used for building the cube. Both logical and physical data models are used for technical purposes. The conceptual and logical data models are built while the physical data model is built. The physical data model is implementation from the logical data model. The methodology since the M&R Cube table is the result of merging several tables from the SAFARI database. The basic requirements from analyzing the old reports in the SAP

Business Object to make the conceptual data model. For the logical data model, it requires the approval for the conceptual data model together with the additional requirements for the cube. The Logical Data Model can be seen Fig 5. The Fig 5 is illustrated the logical data model. The M&R Cube is a new table which will be built in the INFOR database. The other tables are already existed in the SAFARI database. For the existed table, there are only the primary key and the foreign keys. The M&R Cube are mainly the merger of four tables.

The M&R Cube data are come from the dw_fm_work_order_header, dw_fm_purchase_order_header, dw_fm_invoices, and dw_invoice_line because those tables are contained the data regarding on the maintenance and repair services.

Result

Currently, there are several cubes have been built in INFOR BI like Finance, HR, Unit, FX and Contribution. Each cube contains different data for different operational reports. Finance cube contains financial data. Unit Cube contains unit data such as unit's type, unit's age, unit's status. FX Cube contains the exchange rate between currencies in a period of time. Contribution cube contains the customers' contribution to the company like how much they spent on us and how much we spent on them. There is only 50% of the total operational reports have been moved to INFOR BI. In order to complete all the reports, there are several cubes need to be built in
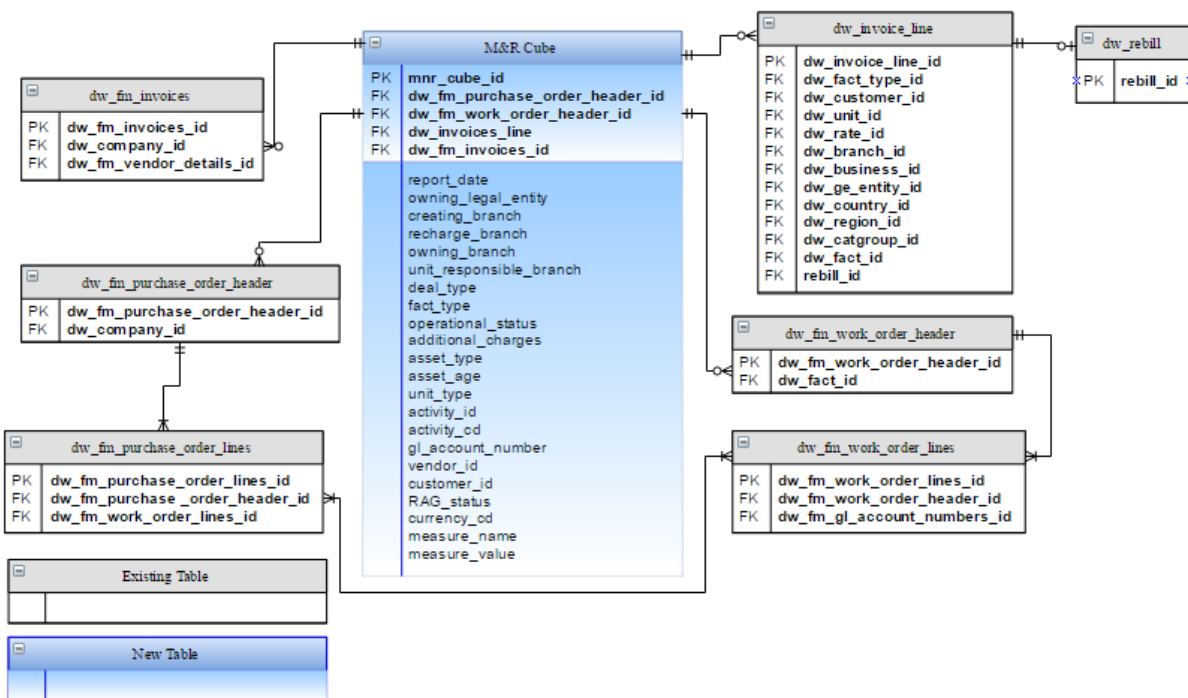

Fig 5. The Logical Data Model Process in TIP Trailer Services

INFOR BI. The assignment is to make a data model for the M&R Cube. M&R Cube will contain the data regarding the maintenance and repair services done by the company. The purpose of the assignment is to increase 20% of the operational reports which can be produced from INFOR BI by making the M&R Cube. The desired end situation is data models for the M&R Cube.

M&R Cube is contained the data mainly from the work order header, purchase order header, rebills, and invoices tables. The work order table is contained the work which are done by the company such as the services regardless customers who have contracts or unrestricted customer. The purchase order table is contained all the transactions which are done by the company such as buying parts of the trailers (lamps, bolts, screws, etc.). Rebills table is contained the data of the cost of the works which is not covered on the contract. So rebills will not happened to the unrestricted customer.

In the M&R Cube, there are twenty two columns. The first twenty columns are come from the sources tables. The measure name and measure value are the additional columns to simplify the calculations of the reports. Measure name is contained the name of the calculations which are used before in the old reporting. This is intended for shorten the reports and dashboards loading processes in the INFOR BI because all the calculations are done in the back end, in the loading data from the database to the cube can be seen Fig 6.
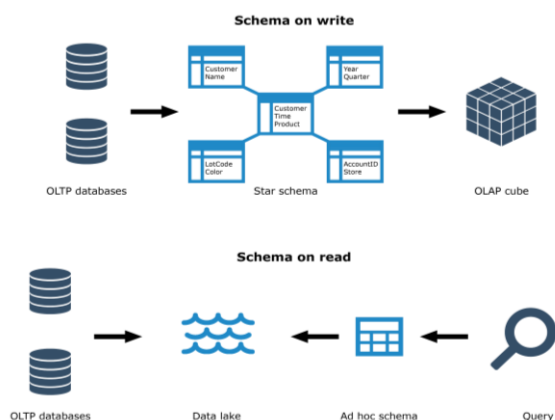

Fig 6. The loading data from the database to the cube

CONCLUSIONS

The initial problem in this research was the ineffective current reporting process. TIP Trailer Services wants to have all the operational reports regarding Maintenance and repair services can be produced in INFOR BI. Thus, the solution of the problem is to build a cube which covers all the maintenance and repair services data. The initial step is to make a data model and it becomes the research.

Based on the answers of the research questions, there are three types of data model which used to build the cube i.e. Conceptual, Logical, and Physical data model. Conceptual data model is used for business purposes. It illustrates the basic concept of the database. The physical data model also describes the relation between the tables.

In conclusion, the data model has been used to build the M&R Cube. The current progress in the M&R Cube is loading the data in the cube. The next steps require to be done is to check if the cube contains correct data based on the data model and the queries. This is mandatory because all the operational reports regarding the maintenance and repair services will be done directly by the cube.

REFERENCES

[1] Horakova, Marketa, and Hana Skalska. 2013. "Business Intelligence and Implementation in a Small Enterprise." *Journal of systems integration* 4.2 (2013): 50.

[2] Turban E., Sharda R., Dursun D. et al, 2011. Decision Support and Business Intelligence Systems. 9th Ed., Prentice Hall, ISBN 978-0-13-610729-3.

[3] Grabova, O., 2010. Business Intelligence for Small and Middle-Sized Enterprises. [Online] SIGMOD Record, June 2010 (Vol. 39, No. 2).

[4] Conceptual Data Model. (n.d.). Retrieved from https://www.techopedia.com/definition/28026/conceptual-data-model

[5] Logical Data Model (LDM). (n.d.). Retrieved from https://www.techopedia.com/definition/30599/ logical-data-model-ldm