

DEVELOPMENT DASHBOARD HR LEARNING BASED OLAP IN LIFE INSURANCE COMPANY

William Frado Pattipeilohy¹; Sanwani ^{2*}; Ade Priyatna³

Program Study Teknologi Informasi¹

Universitas Budi Luhur

budiluhur.ac.id

william.frado@budiluhur.ac.id

Sistem Informasi²

Sekolah Tinggi Manajemen Informatika dan Komputer Nusa Mandiri

nusamandiri.ac.id

sanwani.swq@nusamandiri.ac.id ^{2*}, ade.aqe@nusamandiri.ac.id ³

(*) Corresponding Author

Abstract— Currently in the business world, companies have the challenge to survive and even thrive in the face of business changes that are so fast and flexible both in terms of markets, consumers, products to competitors. Companies are required to be able to take quick and appropriate decisions in the face of all these business changes. Implementation of Business Intelligence in a company becomes a real solution to facing all those challenges. Whereby using Business Intelligence, management within a company can make appropriate decisions based on valid data that has been processed into knowledge and presented from various perspectives needed. This research developed an integrated system in the form of an OLAP-based dashboard to present data reports, especially in the Human Resources Division. Various data in the excel file upload are automatically generated by ETL to the database using SSIS and consolidated into a data warehouse. Processing using SSAS, which is displayed in the form of a dashboard using Reporting Services with a more interesting summary form. With the development of the HR Learning and Development dashboard, top-level management companies get reports for quick, precise, and accurate decision making.

Keywords: Human Resources, HRIS, Business Intelligence, OLAP, Dashboard

Abstrak— Dalam dunia bisnis sekarang, perusahaan mempunyai tantangan untuk tetap bisa bertahan bahkan berkembang dalam menghadapi perubahan bisnis yang begitu cepat dan flexible baik dari segi pasar, konsumen, produk hingga kompetitor. Perusahaan dituntut bisa mengambil keputusan cepat dan tepat dalam menghadapi segala perubahan bisnis tersebut. Implementasi Business Intelligence pada suatu perusahaan menjadi solusi yang nyata dalam menghadapi semua tantangan itu. Dimana dengan menggunakan Business Intelligence, management di dalam suatu perusahaan dapat mengambil keputusan yang tepat berdasarkan data valid yang sudah diolah menjadi pengetahuan dan disajikan dari berbagai sudut pandang yang dibutuhkan. Penelitian ini dikembangkan sistem terintegrasi dalam bentuk dashboard berbasis OLAP untuk menyajikan laporan data khususnya pada Divisi Sumber Daya Manusia. Berbagai data dalam unggahan file excel yang otomatis tergenerate oleh ETL ke basis data menggunakan SSIS dan dikonsolidasikan menjadi data warehouse. Pengolahan menggunakan SSAS yang hasilkan tampilan dalam bentuk dashboard menggunakan Reporting Service dengan bentuk summary yang lebih menarik. Adanya pengembangan dashboard HR Learning and Development ini, para top level management perusahaan mendapatkan laporan untuk pengambilan keputusan secara cepat, tepat dan akurat.

Kata Kunci: Sumber Daya Manusia, HRIS, Business Intelligence, OLAP, Dashboard

INTRODUCTION

The development of information technology has made business competition even tighter. The development of information technology also makes the resulting data increase. The Statista.com site predicts that by 2024 the volume of data and information generated in the world of information

generated from data and technology will be an important factor for the development of a company. With the information, the company can improve its performance in making accurate decisions with the minimum possible risk[1] to maximize the company's profits and progress [2]. Abundant data will be useless if there is no good



management and analysis of business activities is a non-negotiable need.

The speed of data processing and information retrieval affects the speed in deciding on the company[3]. The speed and accuracy in making decisions about a problem or topic in the company make the company able to cope with and even avoid events that can cause losses to the company[4]. Herein lies the importance of Business Intelligence (BI).

In life assurance companies currently, the decision-making process is still using conventional methods, namely processing data using the help of an excel application so that it takes longer to view reports or dashboards [5]. Companies need a fast and real-time decision-making application to assist in the decision-making process so that companies can determine future strategies [6] for business progress in the insurance sector.

There are several options for dashboard development, one of which is the Business Intelligence (BI) application as a concept and method of how to improve the quality of business decision making based on data-based systems [7]. BI is often equated with the terms briefing books, reports and query tools, and executive information systems. BI is a data-based decision support system [8]. Apart from Business Intelligence, there are also web-based development applications combined with programming using python[9]. From the choice of the two applications, Business Intelligence (BI) was selected with the consideration that there is already a complete platform for the dashboard tool to make it easier in the floating process.

The purpose of research on developing HR learning dashboards using business intelligence in life insurance companies is to assist companies in the decision-making process generated from the BI (business intelligence) application dashboard so that companies can make decisions quickly and in real-time[10] so that the company can determine business strategies for progress life insurance business.

MATERIALS AND METHODS

In this study, there are several stages in the development of business intelligence applications, including analysis, system development, testing, and system implementation. In the analysis phase Based on business needs, the Human Resources (HR) workflow for implementing Business Intelligence has been proposed to be developed to meet the needs of the Human Resources (HR) team. This research stage begins with an analysis of existing or running systems[11]. The system applied to the HR division

still uses a manual system because they have to query the system database and then convert it through Microsoft Excel and then submit it to the TOP level of management[12]. Top-level management here is the decision-making stakeholders. After that, a requirements specification analysis will be carried out which will produce several designs, namely conceptual design, logic design, and physical design[13].

The process begins at the beginning of the data source obtained from an excel file with .xlsx format obtained from the human resources (HR) database, using the multidimensional analysis method on OLAP[14]. OLAP can help query quickly, easily, and efficiently and supports business intelligence. The purpose of OLAP, among others, is to make it easier for stakeholders to make decisions based on existing transactional data because[13] OLAP will display data from various dimensions or sides (multidimensional).

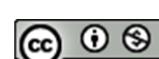
The system development process begins with creating a data warehouse. The first step is to create a staging database, a flat database where it is needed to create a fact table & dimension table[15]. What is meant by a fact table is information containing the size or something that can be calculated, while the dimension table is in the form of information that supports the fact table. After that, the cube and dimensions are made. Cube is a multidimensional data set that allows it to be presented quickly[16]. Cube is the core of the OLAP (Online Analytical Processing) concept in Analysis Services and the data used is HR data in this life insurance company.

At this stage, it is carried out after the creation of the data warehouse is complete[13]. This is done to test whether the basic OLAP operation is implemented successfully according to the output of user data. The implementation process will be carried out after all system development processes are complete then testing.

RESULTS AND DISCUSSION

The high-level process architecture structure and data warehouse in this study can be seen in Figure 1 describe the process architecture and data warehouse.

Figure 1 describes High-level architecture with the implementation of the BI system, this dependence can be overcome because top-level management can immediately get human resource reports directly, either by looking at the application portal or by receiving an automated email. The database used for this BI System is sourced from a data warehouse where the data is obtained from an operational database (OLTP) which is integrated through the ETL (Extract,



Transformation, Loading) process using SQL Server Integration Services and run for a certain period with automating the job.

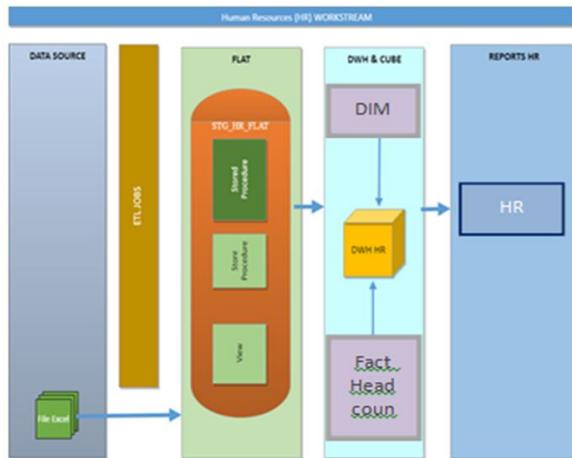


Figure 1. High-Level Architecture Process and Data warehouse

The first step in designing a data warehouse is designing dimension tables and fact tables which will later be analyzed using the BI system. The first stage is to create dimensions. The data warehouse is designed to consist of several dimension tables that are used to provide the measurement context (subject).

The second stage is to create a fact table that represents a business process, namely a business process model as an artifact in the data model. This table contains "measurement" elements or metrics or facts on a business process. In the data warehouse that is built, there is a fact table for employee data, namely fact_headcount, fact_movement, and fact_mpp which consists of several attributes. In this fact table, there is a foreign key for the dimension tables that have been designed.

After the fact table creation is complete, then create a star schema in the star schema containing ten dimension tables and three fact tables. The Fact Table contains the foreign keys of each dimension table. In the star schema, one dimension is represented by one table and each table is represented by several attributes

The next step is making a cube or data cube. Cube is grouping data into dimensional cubes to make data analysis easier. At this stage, a database is established where the data is stored in the form of cells, and the position of these cells is determined by several variables called dimensions. The result of this stage is a data warehouse visualization that has been made previously.

Cube creation is done with the help of Microsoft SQL Service's analysis tools. Before

creating a dashboard we must create a mapping view.

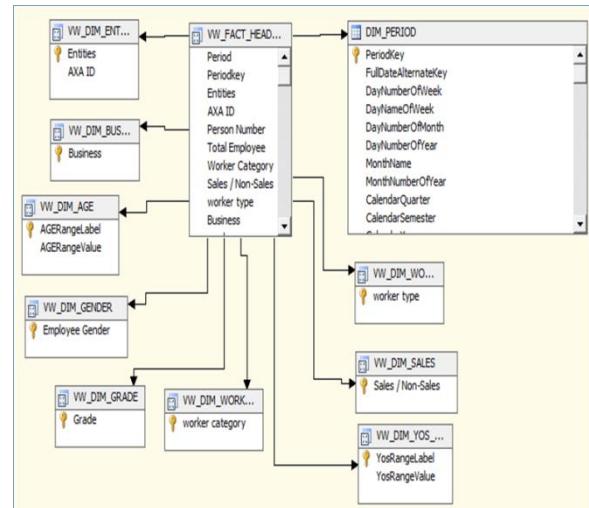


Figure 2. Star Schema about Table

Figure 2 describes stars schema mapping this used for relation view in SQL database. Mapping relation can create manual by key field or automatic with the primary key in database SQL server.

Table 1 Mapping Report Talent Acquisition

KPI	Dashboard Status
Total Position	Sheet TA Select Month Column T = Current Month And Entity Column M = 'Entity Selected by User' Group by Dashboard Status Column U Count (No Request Column A) Per Dashboard Status Sum(No Request Column A) All Dashboard Status
KPI	SLA
Total Hired	Sheet TA Select Month Column T = Current Month And Entity Column M = 'Entity Selected by User' And Dashboard Status Column U = 'Hired' Group by SLA Column V Count (No Request Column A) Per SLA Column V

Table 1 describes the Mapping report talent acquisition used to calculate an aggregation value. The report has calculated to summary KPI Total Position and Total Hired.



Figure 3. Report Talent Acquisition



Figure 3 describes the talent acquisition report to display the total position and total hired per dashboard status in the current month. The report shows, a summary status description in progress, hold and hired. In the display pie chart Hired describe within SLA and exceed SLA with value and present period year to date.

Table 2 Mapping data to KPI and Dimension report employee by age

KPI	Male	Female
Headcount	Sheet	Sheet
Headcount	Headcount	Headcount
Select Date (Column A) = 'Current Month'	Select Date (Column A) = 'Current Month'	Select Date (Column A) = 'Current Month'
and Worker Type (Column Y) = 'FTE'	and Worker Type (Column Y) = 'FTE'	and Worker Type (Column Y) = 'FTE'
and Sales / Non Sales (Column V) = 'Non Sales'	and Sales / Non Sales (Column V) = 'Non Sales'	and Sales / Non Sales (Column V) = 'Non Sales'
and Adcomm / Mancom (Column AO) = 'Adcomm'	and Adcomm / Mancom (Column AO) = 'Adcomm'	and Adcomm / Mancom (Column AO) = 'Adcomm'
and Employee Gender (Column AE) = 'Male'	and Employee Gender (Column AE) = 'Female'	and Employee Gender (Column AE) = 'Female'
and Entities (Column AG) = 'Entity Selected by User'	and Entities (Column AG) = 'Entity Selected by User'	Count(Total Record)
Count(Total Record)		

Table 2 describes mapping data to KPI and dimension this mapping used report Employee by age. To create a business intelligence dashboard report, you need a report mapping data mapping to KPI and Dimensions. Mapping data KPI in there any calculation and query data from database SQL server for generating data with condition Male a female

This stage is a continuation of the system design stage. The result of this implementation is a system that is ready to be tested and used. Implementing a BI system requires hardware and software. For hardware, the need is a server unit for the system and database. At this stage, several reports will be displayed on the results of the development of the business intelligence system, including reports, namely Report Employee by age

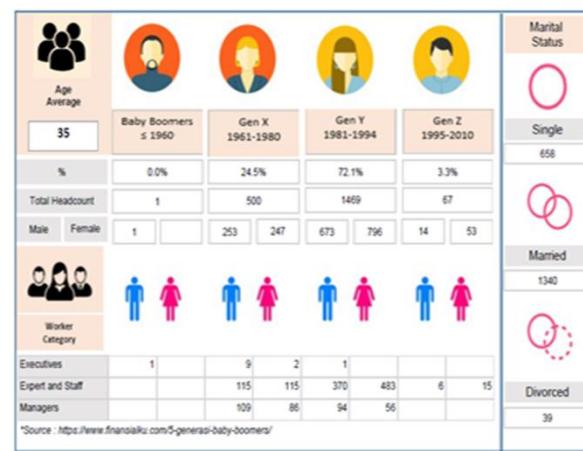


Figure 4. Report Employee by Age

Figure 4 describe report employee by age the report displays data on all total employees based on age and generation. Also displays the total number of male and female employees, the employee's marital status, and the total number of employees based on their position in the company.

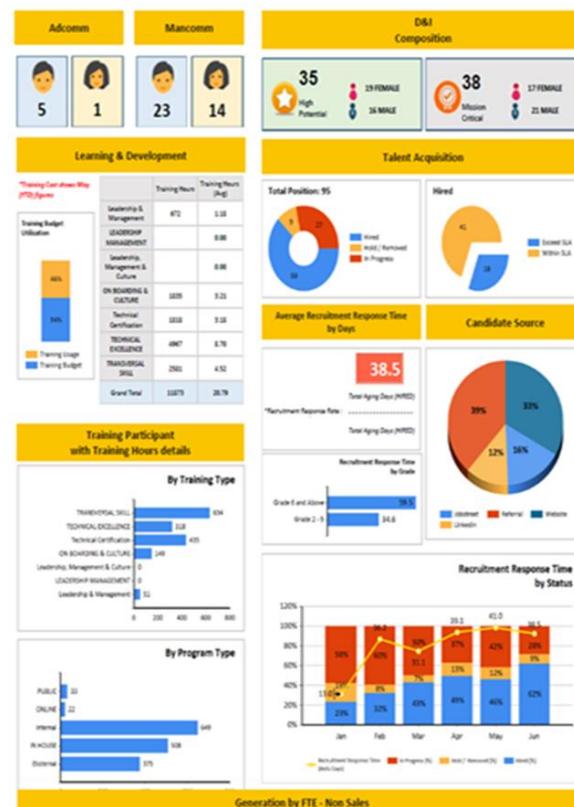


Figure 5. Report Training Employee

Figure 5 describes the employee training report displays data on all reports of employees who participated and training as well as training materials that were attended. Also displays the percentage of employees who have attended training and who have not attended the training.



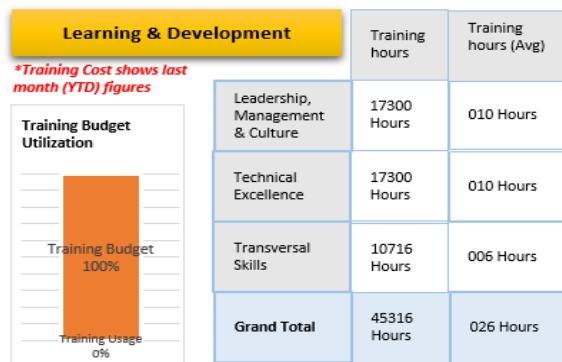


Figure 6. Report Learning and Development

Figure 6 describes the Report learning and development of the total training budget and training hours per type of training in the current year. The component training budget is Leadership, technical excellence, and transversal skill.

Table 3 Table Mapping Report Learning and Development

KPI	YTD
Training Hours	Sheet L&D Training Hours Select Date Column A from First Month until 'Current Month' and Worker Status column V = 'FTE' and Entities column E = 'Entity Selected by User' group by Training Type (Column J) Count(Training Hours Column N) per Training Type (Column J)
Headcount	Sheet Headcount Select Date Column A from First Month until 'Current Month' and Worker Type column Y = 'FTE' and Entities column E = 'Entity Selected by User' Count(Person Number)
% Avg Headcount	Headcount YTD / Total Month
% Avg Training Hours	Training Hours / Avg Headcount
Budget	Sheet Budget Select Entities column A = 'Entity Selected by User' Sum (Budget)
Total Training Cost	Sheet L&D Training Cost Select Month to use Column A from First Month until 'Current Month' and Entity column B = 'Entity Selected by User' Sum (IDR Column I)
% Training Budget	(Budget - Total Training Cost) / Budget
% Training Usage	Total Training Cost / Budget

Table 3 describes mapping report learning and development used to calculate field-training hours, headcount, average headcount, presents training, budget, and training cost.



Figure 7. Report D & I Composition

Figure 7 describes D & I Composition report, this report shows how many high potencies and important tasks for every man and woman this month.

Table 4 Data Mapping D & I Composition

KPI	High Potential	Mission Critical
Headcount D&I (Male)	Sheet D&I Select Date (Column A) = 'Current Month' And D&I Composition (Column B) = 'High Potential' and Entity (Column C) = 'Entity Selected by User' Get (Male (Column D))	Sheet D&I Select Date (Column A) = 'Current Month' And D&I Composition (Column B) = 'Mission Critical' and Entity (Column C) = 'Entity Selected by User' Get (Male (Column D))
Headcount D&I (Female)	Sheet D&I Select Date (Column A) = 'Current Month' And D&I Composition (Column B) = 'High Potential' and Entity (Column C) = 'Entity Selected by User' Get (Female (Column E))	Sheet D&I Select Date (Column A) = 'Current Month' And D&I Composition (Column B) = 'Mission Critical' and Entity (Column C) = 'Entity Selected by User' Get (Female (Column E))

Table 4 describe data mapping D & I Composition for report D & I Composition this mapping is used to calculate field headcount D&I male and headcount D&I female.

CONCLUSION

From the results of research on dashboard development using OLAP, the results obtained for each analysis report, namely top-level management or decision-making stakeholders can enter the portal system and view the report dashboard, Presentation of reports from Human Resources data, no need to ask the MIS team. To send reports via email or hardcopy to top-level management, the implication of this Business Intelligence system has proven to make it easier for top-level management or decision-making stakeholders to be able to see employee needs based on existing KPIs because data is presented in a more attractive form, namely graphics and interfaces which is user friendly, by looking at employee data in a top-level management company can quickly make decisions which can later help determine the business



direction, make business strategies and make decisions to increase company needs, After going through the user acceptance phase e testing which shows the similarity with user data based on existing summary reports and KPIs as well as carrying out the implementation verification testing process where it shows that the system successfully displays data according to the data required by the user. Suggestion In developing the next report it is expected not only for HR needs but for all department I of the Life insurance company so that in the future all analysis of company activities can be monitored from one report portal that has been integrated with realtime data.

REFERENCE

- [1] Z. Nur and I. Mukhlas, "Implementasi Business Intelligence Pada Manajemen Report Bank XYZ," *J. Sains Dan Senni Pomits*, vol. 3, no. 3, pp. A16–A21, 2014.
- [2] W. S. Prasetya, Kusrini, and H. Al Fatta, "Sistem Pendukung Keputusan Pemilihan Produk Asuransi Studi Kasus : PT Commonwealth Life Pontianak Decision Support System Insurance Product Selection Case Study: PT Commonwealth Life Pontianak," *J. STMIK AMIKOM*, vol. 8, no. 1, pp. 105–116, 2018.
- [3] A. Zikri, J. Adrian, A. Soniawan, R. Azim, R. Dinur, and R. Akbar, "Implementasi Business Intelligence untuk Menganalisis Data Persalinan Anak di Klinik Ani Padang dengan Menggunakan Aplikasi Tableau Public," *J. Online Inform.*, vol. 2, no. 1, pp. 20–24, 2017.
- [4] C. Vercellis, *Business Intelligence: Data Mining and Optimization for Decision Making*. 2009.
- [5] N. S. Ambarwati, G. A. Yuniarta, and N. K. Sinarwati, "Pengaruh Modal Kerja, Likuiditas, Aktivitas dan Ukuran Perusahaan Terhadap Profitabilitas Pada Perusahaan Manufaktur yang Terdaftar di Bursa Efek Indonesia," *e-journal S1 Ak Univ. Pendidik Ganeshha*, vol. 3, no. 1, 2015.
- [6] G. Ade and Okfalis, "Sistem Pendukung Keputusan Untuk Produk Asuransi Jiwa Bagi Nasabah Menggunakan Metode SMARTER," *J. Sains, Teknol. dan Ind.*, vol. 12, no. 1, pp. 73–79, 2014.
- [7] Kusnawi, "Implementasi OLAP dan Reporting Services sebagai Bagian Proses Business Intelligence," *Bisnis Intelejen*, vol. 12, no. 2, pp. 43–48, 2010.
- [8] E. Turban, J. E. Aronson, and T.-P. Liang, "Decision Support Systems and Business Intelligence," *Decis. Support Bus. Intell. Syst. 7/E*, pp. 1–35, 2007.
- [9] H. Kurniawan, B. Setiyono, and R. R. Isnanto, "Aplikasi Penjawab Pesan Singkat Automatis Dengan Bahasa Python," *Dr. Diss.*, 2011.
- [10] T. Kusnadar, "Penerapan Crm Dengan Sistem Informasi Berbasis Web Untuk Kepuasan Pelanggan," *J. Comput. BISNIS*, vol. 5, no. 1, pp. 6–13, 2011.
- [11] S. Kasus, D. Pt, I. Adi, and P. Semarang, "Implementasi Sistem Business Intelligence Untuk Melakukan Analisis Data Guna Mendukung Pembuatan Keputusan Manajer," *Techno.COM*, vol. XIV, no. 02, pp. 83–92, 2008.
- [12] A. Priyatna, "Implementasi Sistem Penunjang Keputusan Menggunakan Business Intelligence Untuk Umkm Di Gunung Putri Kab.Bogor," *J. Khatulistiwa Inform.*, vol. 7, no. 1, pp. 7–12, 2019.
- [13] L. Hasim, "Penerapan Business Intelligence Pada Manajemen Dashboard Report Perusahaan Asuransi," *Syntax Lit.; J. Ilm. Indones.*, vol. 4, no. 12, pp. 123–136, 2019.
- [14] N. Ardista, P. Purbandini, and T. Taufik, "Rancang Bangun Data Warehouse Untuk Pembuatan Laporan dan Analisis pada Data Kunjungan Pasien Rawat Jalan Rumah Sakit Universitas Airlangga Berbasis Online Analytical Processing (OLAP)," *J. Inf. Syst. Eng. Bus. Intell.*, vol. 3, no. 1, pp. 40–51, 2017.
- [15] A. Dwiputra Wijaya and T. Gantini, "Analisis Forecasting dengan Implementasi Dashboard Business Intelligence Untuk Data Penjualan Pada PT. X," *Prof. Drg. Surya Sumantri*, vol. 1, no. 2, pp. 457–470, 2019.
- [16] Maimunah, S. F. Saadah, and R. Andrian, "Rancang Bangun Aplikasi Data Warehouse Untuk Business Intelligence," *CSRID J.*, vol. 5, no. 1, pp. 1–10, 2012.

