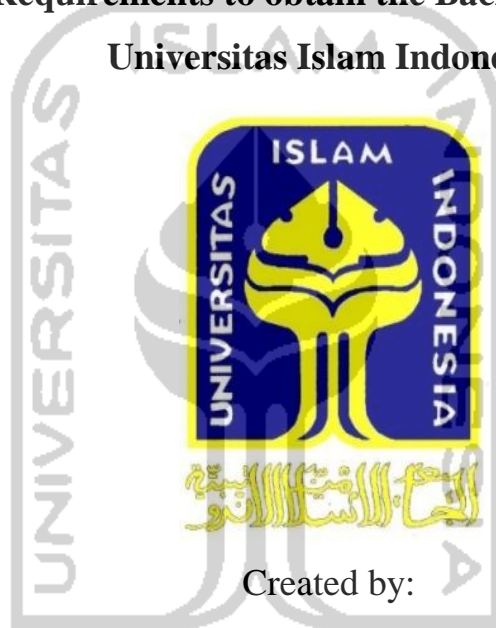


**ANALYZING BUSINESS PERFORMANCE USING BUSINESS  
INTELLIGENCE SYSTEM**

**THESIS**

**Submitted to International Program  
Industrial Engineering in Partial Fulfillment of  
The Requirements to obtain the Bachelor Degree at  
Universitas Islam Indonesia**



Created by:

Name : Anggit Prabangkara

Student number : 07522054

**INTERNATIONAL PROGRAM  
DEPARTMENT OF INDUSTRIAL ENGINEERING  
FACULTY OF INDUSTRIAL TECHNOLOGY  
UNIVERSITAS ISLAM INDONESIA  
YOGYAKARTA**

**2012**

## Declaration Letter

I declare this research was conducted by myself except several citations that have been mentioned it's sources.

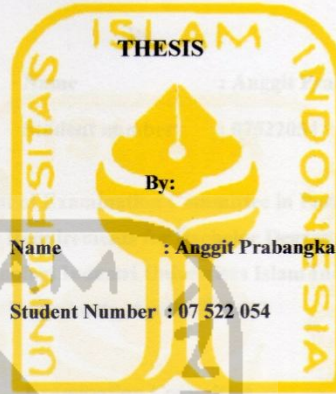
Yogyakarta, April 2012



AnggitPrabangkara

NIM 07522054

THESES APPROVAL OF SUPERVISOR  
ANALYZING BUSINESS PERFORMANCE USING BUSINESS  
INTELLIGENCE SYSTEM

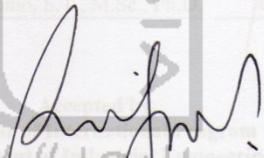


Name : Anggit Prabangkara  
Student Number : 07 522 054

Yogyakarta, April 2012

Approved,

Thesis Supervisor,

  
(Muhammad Ridwan Andi Purnomo, ST., M.Sc., Ph.D)

**THESIS APPROVAL OF EXAMINATION COMMITTEE**

**ANALYZING BUSINESS PERFORMANCE USING BUSINESS INTELLIGENCE SYSTEM**

By

Name : Anggit Prabangkara

Student number : 07522054

Was defended in front of Examination Committee in Partial Fulfillment  
of the Requirements for Bachelor Degree  
Fakultas Teknologi Industri Universitas Islam Indonesia  
Yogyakarta, April 27<sup>th</sup> 2012

Examination Committee

Agus Mansur, ST., M.Eng.Sc.  
Examination Committee Chair

Nashrullah Setiawan, ST., M.Sc.  
Member I

Muhammad Ridwan Andi Purnomo, S.T., M.Sc., Ph.D.  
Member II

Accepted by,

Director of International Program  
Department of Industrial Engineering  
Faculty of Industrial Technology  
Universitas Islam Indonesia



Muhammad Ridwan Andi Purnomo, S.T., M.Sc., Ph.D.



## DEDICATION PAGE

*This thesis dedicated to Allah.SWT*

*My parents, my brothers and my 'sisters and  
Someone I love,*

*You're all my everything's*



## MOTTO

Because after a misery there will be an ease. After a misery there will be an ease.

QS. Al-Insyirah: 5-6

"Allah does not charge a soul except [with that within] its capacity. It will have [the consequence of] what [good] it has gained, and it will bear [the consequence of] what [evil] it has earned. "Our Lord, do not impose blame upon us if we have forgotten or erred. Our Lord, and lay not upon us a burden like that which You laid upon those before us. Our Lord, and burden us not with that which we have no ability to bear. And pardon us; and forgive us; and have mercy upon us. You are our protector, so give us victory over the disbelieving people." (Q.S. Al-Baqarah 286)

**"Dream on, because God will embrace those dream."**

**- Arai -**

UNIVERSITAS ISLAM INDONESIA  
الجامعة الإسلامية  
الاندونيسية

## PREFACE

*Assalamualaikum Wr. Wb*

I prayed the presence of Praise Allah's blessings, His grace and guidance, so that I could finish this thesis report on time. Sholawat and do not forget the greetings were offered for our master the Prophet Muhammad saw.

I conducted the thesis research as on of requirements to complete my bachelor degree as student of Industrial Engineering Department of Faculty of Industrial Technology Universitas Islam Indonesia. During the implementation of the thesis research, I met many difficulties and obstacles in completing these reports, but finally with the supports and guidance from some people I could finish this report, although there are still many mistakes. For that I sincerely hope that suggestions and constructive criticism to improve this report.

On this occasion with all humility to say a big thank you to:

1. Allah SWT His grace and guidance that never stop guiding us.
2. Sukarno and Eli Kistiani, both parents for blissful and unlimited love.
3. Muhammad Ridwan Andi Purnomo. ST, M.Sc, Ph.Das my thesis supervisor for the support and guidance.
4. My beloved brothers, GalihNurWijaya, GesangPentaSanjaya and sisters, SuprihatinKartika Sari, WindaPuspitasari thanks for all support.
5. Head of Industrial Engineering Department.
6. Huda Muhammad Badri as the owner of CV Huda Karya.
7. Lutfira Amalia, for all support and teach me how valuable each time that we have.

8. All friends from 2007's for all friendship and time that share, especially Abiyoga Kristanto, Afrilia Dwi R, Taufan Adi Pradesta, Restamaji, Mirza Naufan Hilmy, RindaAgustiana, ViraMegasariHaqni, DindaElingKusumaningSasmito for everything.
9. All people that was help the author to finish this report

Hopefully that was author did, will be beneficial for all people and add insight and knowledge of readers in general and all assistance that has been donated to charity accepted Allah as pious and render with a big reward.

*Jazakummullah khoiron katsiiron jazza. Billahittaufiq wal hidayah*

*Wassalamu'alaikum Wr. Wb*



Yogyakarta, April 2012

Author



## ABSTRACT

*Business intelligence (BI) refers to technologies, applications and practices for the collection, integration, analysis, and presentation of business information and sometimes to the information. It is usually used to make data representative more attractive and understandable. This research tries to develop system that represents historical data using BI modules so it becomes more attractive and understandable. In developing system MySQL database and Pentaho become main tools. The results of this research are profit – loss scale that built and become one of decision support system for decision maker.*

*Keywords: Business Intelligence, MySQL Database, Pentaho, System Development, Profit – Loss Scale.*



## TABLE OF CONTENTS

COVER.....	i
DEDICATION LETTER.....	ii
APPROVAL PAGE OF SUPERVISOR.....	iii
APPROVAL PAGE OF EXAMINER COMMITTEE.....	iv
DEDICATION PAGE.....	v
MOTTO.....	vi
ACKNOWLEDGMENT.....	vii
ABSTRACT.....	ix
TABLE OF CONTENTS.....	x
LIST OF FIGURES.....	xii
LIST OF TABLES.....	xiv
CHAPTER I INTRODUCTION	
1.1 Background.....	1
1.2 Problem Formulation.....	2
1.3 Scope of Research.....	2
1.4 Research Objectives.....	3
1.5 Benefit of Research.....	3
1.6 Writing Systematics.....	3
CHAPTER II LITERATURES REVIEW	
2.1 Literature Review.....	5
2.1.1 Previous Research.....	5
2.2 Theoretical Review.....	7
2.2.1 Benefit/Cost Ratio (BCR).....	7
2.2.2 Profit - Loss Scale.....	8
2.2.3 Business Intelligence.....	9
2.2.4 Pentaho.....	10
2.2.5 Pentaho Data Integration.....	11
2.2.6 BI Server & Platform.....	11
2.2.7 XAMPP.....	14
2.2.8 MySQL Database.....	14

## CHAPTER III RESEARCH METODOLOGY

3.1	Research Objects.....	16
3.2	Business Process .....	16
3.3	Data Collectiong Method .....	17
3.3.1	Data Collecting .....	17
3.3.2	Data Requirement .....	17
3.4	Research Flowchart.....	19

## CHAPTER IV CUSTOMIZING PENTAHO SYSTEM FOR BUSINESS

### PERFORMANCE ANALYSIS

4.1	Company Business Process.....	23
4.2	Database Development .....	24
4.3.1	MySQL .....	27
4.3	Pentaho Development .....	33
4.4.1	Connecting MySQL into Pentaho/BI Server .....	33
4.4.2	Creating Smart Dashboard.....	36
4.4.3	Creating Filter on Dashboard.....	40
4.4.4	Creating Interactive Report on Pentaho.....	43
4.4.5	Creating Analyzer Report .....	44
4.4.6	Creating .....	46

### CHAPTER V DISCUSSION

5.1	Analyzer Report For Busines Analysis.....	50
5.2	Non Systemized Factor.....	51
5.3	Discussion .....	52

### CHAPTER VI CONCLUSION AND SUGGESTION

6.1	Conclusions.....	54
6.2	Suggestion.....	54

### REFERENCES

### APPENDICES

## LIST OF FIGURES

Figure 3.1 Research Flowchart .....	19
Figure 4.1 CSV File Raw Data .....	25
Figure 4.2 XAMPP Structure.....	28
Figure 4.3 Imported Data Into XAMPP.....	32
Figure 4.4 Pentaho User Console Home.....	33
Figure 4.5 Data Source Wizard.....	34
Figure 4.6 Database Connection.....	35
Figure 4.7 Test Connection.....	36
Figure 4.8 Dashboard.....	37
Figure 4.9 Select Data Source.....	38
Figure 4.10 Query Editor .....	38
Figure 4.11 Chart Designer.....	39
Figure 4.12 Full Dashboard .....	40
Figure 4.13 Filters.....	41
Figure 4.14 Filter Query Editor .....	41
Figure 4.15 Connecting filter.....	42
Figure 4.16 Filters on Dashboard.....	42
Figure 4.17 Reporting on Pentaho .....	44
Figure 4.18 Analyzer Report Data Source Wizard .....	45
Figure 4.19 Analyzer Report.....	46
Figure 4.20 Analyzer Report View .....	46
Figure 4.21 Filters on Date .....	48
Figure 4.22 Analyzer Report with Filter.....	48
Figure 4.23 Numeric Filter.....	49
Figure 4.24 Analyzer Report with Numeric Filter.....	49



## LIST OF TABLES

Table 4.1 Data Extraction .....	24
Table 4.2 Example Data.....	26



# CHAPTER I

## INTRODUCTION

### 1.1. Background

Recently, business competition becoming a major challenge in business world. The decision to be taken by company should be accurate based on real time data. This business development supported by the increasing of sophisticated information system, especially in business intelligence systems. Business Intelligence (BI) mainly refers to computer-based techniques used in identifying, extracting, and analyzing business data, by product and/or departments, or by associated costs and incomes. BI systems provide the ability to analyze business information in order to support and improve management decision making across a broad range of business activities (Collier, 2008)

Luhn (1959) used the term of BI and defined it as the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal. In late 80's BI has been developed so fast, and simultaneously with the development of industry as well. In middle of 90's, BI become tools that widely used in industrial and academic world. Term such as Online Analytical Processing (OLAP), data warehouse, executive information system becomes main topic in the BI. Because of this development, there are so many IT company that develop the application of BI to support the decision making and data analysis. This BI tool has been widely developed, like database management system, especially business analytics software. However, mostly of this software has been developed as closed

application, so that the user hard to know how the software works and the engine behind it. On the other hand, open source BI software provides convenience rather than the close software. One of the open source BI software promises to users in approaching efficiency, effective, accuracy in data analysis for determine the high product performance is Pentaho. The aim of BI system and software is the top level management in this case the decision maker. Because BI purposed to identifying, extracting and analyzing business data that lead to the company strategy which decide by decision maker.

Base on the background, this research focus on analyzing business condition by using business intelligence system tool in order to analyze business efficiency to support decision maker.

## **1.2. Problem Formulation**

Based on the background above, the problem to be solved in this research is how to analyze business performance to support decision maker.

## **1.3. Scope of Research**

There are some boundaries for this research such as:

- a. The proposed BI system is a system prototype, not a final product to be installed in the real business system.
- b. Does not considering interface and system development costs.
- c. Data used in this research limited to static data. However, for the new application, the system is able to respond dynamic data.

- d. Analyze that conducted is a decision support system.
- e. Analyze limited to profit-loss scale.

#### **1.4. Research Objective**

Objective of this research is analyzing business performance by customizing BI systems in order to support decision maker.

#### **1.5. Benefit of Research**

The significance benefits of this research will be stated as follows:

- a. Improve efficiency, effectiveness, accuracy in data analysis to learn business conditions.
- b. Fast and accurate in analyzing data become decision making.
- c. Develop integrated Database Management System with BI system.

#### **1.6. Writing Systematic**

## **CHAPTER II LITERATURE REVIEW**

This chapter is the backbone to determine the current study from the related previous research. It contains information about the result of related previous research and supporting literatures underlying the research.



### **CHAPTER III RESEARCH METHODOLOGY**

This chapter consists of research methodology. It will describes the detailed series of research object, system development, research design, research procedure, and data collecting, processing and analyzing method.

### **CHAPTER IV SYSTEM DEVELOPMENT**

This chapter explains the data collecting and processing in order to achieve the research objective.

### **CHAPTER V SYSTEM TESTING AND DISCUSSION**

This chapter discusses about the result of the previous chapter. Several factors which were not considered in the previous chapter will be discussed in this chapter in order to get a comprehensive understanding about the whole research.

### **CHAPTER VI CONCLUSION AND SUGGESTION**

This chapter gives short and precise statements described in the previous chapter. Suggestion related to the current study in purpose of the advancement in the future research is given based on the limitations of the current research.

### **REFERENCES**

### **APENDICES**

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Literature Review**

##### **2.1.1 Previous Researches**

Several research has been conducted in BI field. Davern et al. (2008) try to measure the effect of BI for relation business process and organizational performance. The new business value of IT-intensive system has been successfully developed. The measurement itself is based on an understanding of characteristics of BI system in a process-oriented framework.

Pozzebon and Petrini (2009) use BI as an integrator of socio-environmental indicators and organizational context. The particular attention of this research is on phase of BI project, the information sustainable practice that systematic way of defining relevant information in order to integrate it in reporting activities. The main contribution of that paper is to purpose a conceptual model that seeks to support the process of integration of socio-environmental indicators into organizational strategy for sustainability.

Cheng Liu et al. (2011) evaluate index system of structured BI, and the Analytical Hierarchy Process (AHP) technique is used to confirm the index weights. Further, fuzzy TOPSIS is utilized to determine the synthetically scores of different companies. The result is

verify the scientific and effectiveness of the method. This paper provides a more scientific and reliable basis for systems engineering in decision analysis.

A qualitative correlation coefficient mining method which is capable of uncovering hidden patterns of market has been developed by Cheung and Li (2011). The propose quantitative correlation coefficient mining method is found to process higher accuracy, better computational effectiveness and higher predictive power. With the new approach, associations for product relations and customer periodic demands are revealed and this can help to leverage organizational marketing capital to enhance quality and speed of promotions as well as awareness of product relations.

Implementation BI concepts with Pentaho at the research evaluation the researcher decided to do the proof by applying the Pentaho software on a real world business case. A secondary research goal was to test whether Pentaho is an appropriate training tool for use in university class rooms. Based on this research experience, Pentaho can be a very useful tool in business, although, in order to compete with commercially available BI suites, extensions are necessary related to the presentation and dashboard layer, making it more user-friendly in the way how they are created (Tuncer, 2009).

Based on several previous research above, there's no research according BI and Pentaho that aim to analyzing business. So it needs to make system that can analyze business performance to help decision maker.

## 2.2 Theoretical Review

### 2.2.1 Benefit/Cost Ratio (BCR)

BCR is the comparison between profit of a project or product with cost value. BCR is an analysis used to determine amount of gains / losses (cost / benefit) as well as feasibility of a project. BCR has undergone many developments. One of the BCR analysis developments is in economic development field. In the economic development field, this analysis is commonly used to determine the feasibility of a project. In general, the BCR can use to:

1. Assist in decision-making process

In decision making process, there are a lot of factor that should be considered by decision maker. In this case, BCR can assist decision maker to determine the decision that they made based on BCR information.

2. Adding alternatives or choices

Besides assisting in decision making process, BCR also adding alternative or choice. It means that the decision maker can get another alternative or choice based on BCR provide able information.

3. Reduce the cost of an ineffective alternative.

With BCR that accurately determine feasibility of a project, other alternatives that ineffective can eliminate in order to keep efficiency.

### **2.2.2 Profit – Loss Scale**

Profit – loss scale is the system of economic relations, arising in the process of socialist reproduction, between society as a whole and its various production links (enterprises and associations), as well as between the individual subdivisions themselves, in the context of the socially necessary expenditure of labor and allocation of the enterprises' net income. Profit-and-loss accounting relations are organized as an official state system governed by laws and administrative acts. In practice, profit-and-loss accounting is an administrative and management method under which the economic performance of each enterprise is commensurate in monetary terms with its production expenditures; each enterprise, by covering its outlays with the monetary income obtained from the sale of its products, ensures the profitability of production. Profit-and-loss accounting is based on the use of commodity and monetary relations, including in particular the categories of price, profit, and prime cost of production. Society exercises monetary control over the enterprises' activity through the comparison of income and expenditure in the fulfillment of the plan with respect to production profits and profitability and through the allocation of credit for performance. Monetary control in all its aspects prompts the enterprises to make rational use of their resources, to upgrade economic performance indicators, and to pursue a policy of economies.

In the end, profit – loss scale will compare between profit and loss of a company periodically. From this analysis the user will know about condition of business whether profitable or vice versa.

### 2.2.3 Business Intelligence

BI refers to technologies, applications and practices for the collection, integration, analysis, and presentation of business information and sometimes to the information. The reason of BI term that dates at least to 1958 is to support better business decision making. Thus, BI is also described as a decision support system DSS (Delailah, 2008). BI use data collected from a data warehouse or a data mart. Not all data warehouses are used for business intelligence, also not all business intelligence applications require a data warehouse. In order to distinguish between concepts of BI and data warehouses. When using this definition, BI also includes technologies such as data integration, data quality, data warehousing, master data management, text and content analytics, and many others that the market sometimes lumps into the Information Management segment. Therefore, referring to data preparation and data usage as two separate, but closely linked segments of the business intelligence architectural stack.

BI systems provide historical, current, and predictive views of business operations. Most often used data that has been gathered into a data warehouse or a data mart and occasionally working from operational data. Software elements support the use of this information by assisting in the extraction, analysis, and reporting of information. Applications tackle sales, production, financial, and many other sources of business data for purposes that include, notably, business performance management. Information may be gathered on comparable. Below are the examples of Business intelligence:

- a. Operational reporting - Typically static, based on a single operational system.  
Examples: current inventory report, customer invoice
- b. Standardized reporting - Typically static, IT-driven based on a single system, on a recurring basis. Examples: Monthly sales report, Quarterly customer satisfaction report  
Ad hoc reporting frequently dynamic, end user driven, on an ad hoc basis.  
Example: Business user wants to see what products a certain customer has purchased over the last 6 months.
- c. Embedded reporting - Typically blends report content directly into packaged or custom operational applications.
- d. OLAP reporting - Typically interactive, exploratory, dimensional (sales by product by time period by geography by channel)
- e. Dashboards - Typically a single, simplified view of Key Performance Indicators.
- f. Data mining - Involves automated analysis of large volumes of data, usually customer or consumer data. Tries to uncover hidden patterns and correlations in the data
- g. Data warehousing - Integrating information from multiple different systems into a centralized data store. Example: integrating customer order, customer service, and customer marketing data into a centralized database.

#### **2.2.4 Pentaho**

Pentaho is a collection of application of Business Intelligence (BI) is growing rapidly and is free open source software (FOSS) which runs on the Java platform. Applications developed by

Pentaho Corp., based in Orlanda, USA. In addition to its free and the adoption of increasingly widespread, support can be obtained from Pentaho Corp. in the form of Service Level Agreement (SLA) and packaged in the Enterprise Edition version of its annual subscription, or need an annual contract. In addition, if using the community edition is free, then it could get much support from Pentaho system integrators worldwide including in Indonesia.

### **2.2.5 Pentaho Data Integration**

Pentaho Data Integration consist Rich Feature Set Enterprise-class with high performance and scalability. It is 100% Broad Database Support, Meta-data Driven Graphical and model-driven design Mature. Pentaho Data Integration is an engine along with a suite of tools responsible for the processes of extracting, transforming, and loading (Marina, 2010).

### **2.2.6 BI Server & Platform**

Pentaho BI Server is a portal web application that consists of services web service, workflow engine, and as a user interface for operational reporting and analysis in Pentaho. BI Server as an automated workflow in it already contained a variety of Pentaho BI engine, namely:



## A. Pentaho Reporting

Pentaho Reporting is a class library for generating reports. XML-based templates provide flexible reporting and printing functionality using data from multiple sources. It supports output to display devices, printers, PDF, Excel, HTML, XHTML, PlainText, XML and CSV files. Pentaho Reporting was formerly known as JFree Report, but has been renamed to 'Pentaho Reporting' to avoid confusion with the other JFree.org projects.

Pentaho Report Designer is a sophisticated report creation tool that you can use standalone, or as part of the larger Pentaho BI Suite. It enables professionals to create highly detailed, "pixel-perfect" reports based on adequately prepared data from virtually any data source. Report Designer is not the only way to create reports with Pentaho software. Through the BI Server's Web based Pentaho User Console you can also use the Interactive Reporting interface, or you can integrate the Pentaho Reporting engine (on which Report Designer is built) into your own software. If you're an XML , you could also use Design Studio to create a report by hand via an action sequence. This user guide covers all of the major Report Designer features and functions, from adding a data source to working with conditional formatting and formulas. You can read it cover-to-cover to attain a reasonably comprehensive Report Designer education, or you can use it strictly as a reference to consult when you run into an operational challenge (Pentaho Report Designer User Guide, 2011)

## **B. Pentaho Dashboard**

Pentaho dashboard is tight business process integration. It contain embedded workflow and can receive events from or trigger events in external systems. Pentaho Open BI Suite Integration Comprehensive auditing of user activity, performance and data access. The best feature of Pentaho dashboard is the context-sensitive drilling to reports or analysis. It has the integrated security, scheduling, alerting, portal integration.

There are three ways to fashion a dashboard from Pentaho content :

- a. Pentaho Dashboard Designer, purpose Quick and easy dashboards based on existing Pentaho content produced by Report Designer, ad hoc reporting, Interactive Reporting, JPivot, or Analyzer; or charts and data tables created through Dashboard Designer or the Data Access Wizard. Basically, Dashboard Designer enables you to display content in a predefined layout; there is a low degree of customization, but greater ease of use than other dashboard methodologies.
- b. Community Dashboard Framework (CDF), purpose CDF is an open, community-supported framework for creating dashboards from XML configuration files and HTML templates. CDF dashboards must be created by hand from a text editor and are thus not nearly as quick and easy to create as Dashboard Designer dashboards, but there is much more flexibility with how content is displayed and refreshed.
- c. Custom JSPs, purpose If you are a Java Web developer (or have one on staff), you can create your own JSPs that display Pentaho content in whatever ways are

possible through the BI Platform's content and service APIs. Of course this is the most difficult way to create a dashboard, but it allows you complete freedom in terms of the type of content that can be displayed, and how that content is laid out. Depending on the complexity of the design and the technical details of the implementation, a JSP dashboard could perform better than CDF or Dashboard Designer.

### **2.2.7 XAMPP**

XAMPP is a free application software and open platform and a compilation of some program as well. Its function is as a stand-alone server, which consists of the program Apache HTTP Server, MySQL database, and language translator written in PHP and Perl programming. XAMPP is name stands, where X (four of any operating system), Apache, MySQL, PHP and Perl. The program is available in the General Public License and it is free, easy to use web server that can serve dynamic web page display.

### **2.2.8 MySQL Database**

MySQL is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. The SQL phrase stands for Structured Query Language. Developers can embed MySQL as a library within an application, or use MySQL as a standalone database engine. MySQL is available as binaries, or because it is Open Source, developers can download, modify, and compile the source code on the target server. MySQL supports transactional and non-transactional tables, and one-way replication. The MySQL

developers built the database for high performance, especially with the use of non-transactional tables. In addition, MySQL takes advantage of multiple processors, as it is fully multi-threaded using kernel threads.



## CHAPTER III

### RESEARCH METHODOLOGY

#### 3.1 Research Object

The objective of this research is analyzing business performance by customizing BI and DBMS from the data of amount of the product, cost, and price to analyze business. This research takes case study at metal casting company CV HUDA KARYA which is located in Jonggo, Karanganyar, Cawas, Klaten, Central Java.

#### 3.2 System Development

Several steps to customizing Pentaho are:

a. Developing Database

Database development is the first step in order to create new system. Database built from raw data to be imported to MySQL database, and then connecting to Pentaho.

b. Connecting Database to Pentaho

To connecting Database to Pentaho, connection here needed because Pentaho will take data from the database. This step is required because Pentaho itself doesn't have native database.

c. Creating Smart Dashboard

The main function of dashboard is to monitor the process of real system and to let user knows the comparison of data on real system to help in decision making. Smart dashboard consist of data table, pie chart, bar chart, and so on.

d. Creating Interactive Report and Analyzer Report

Interactive and analyzer report basically a report to show the data result from database. In these report user can easily specify data to be displayed. Especially on analyzer report, filter can be used by user to know in detail what kind of data to be used for further analysis.

### **3.3 Data Collecting Method**

#### **3.3.1 Data Collecting**

There are 2 ways to collect data in this research, which are:

1. Interview.

This method using direct interview, debriefing some question to the people that work in the company and ask about anything that related to the research, particularly the owner of CV HUDA KARYA.

2. Literature Study

Literature study is the collecting data method that focused in searching information, literature, theory, writing systematics that use for basic of this research.

### 3.3.2 Data Requirement

The requirement of data of this research divided into 2 kind data, which are:

#### 1. Primary Data

Primary data is data collected directly from the company. Data primer includes:

##### a. Product Name

This data show the name of product that produce by company.

##### b. Quantity

Quantity here means the quantity of product that produce by company.

##### c. Price

This data show the price of each product.

##### d. Production Cost

Production cost show how much cost that need to produce 1 product.

##### e. Setup Cost

This is cost of every setup that made by company. This data show the cost that need to setup every machine before use for production.

##### f. Rework Cost

This data show the cost that need to rework every reject product.

## 2. Secondary Data

Secondary data is data derived from other sources such as the results of previous studies, journals and others that used to acquire and explore theories that support problem solving in this research.





### 3.4 Research Flowchart

This flowchart represents the main steps taken by the researcher to build the modules:

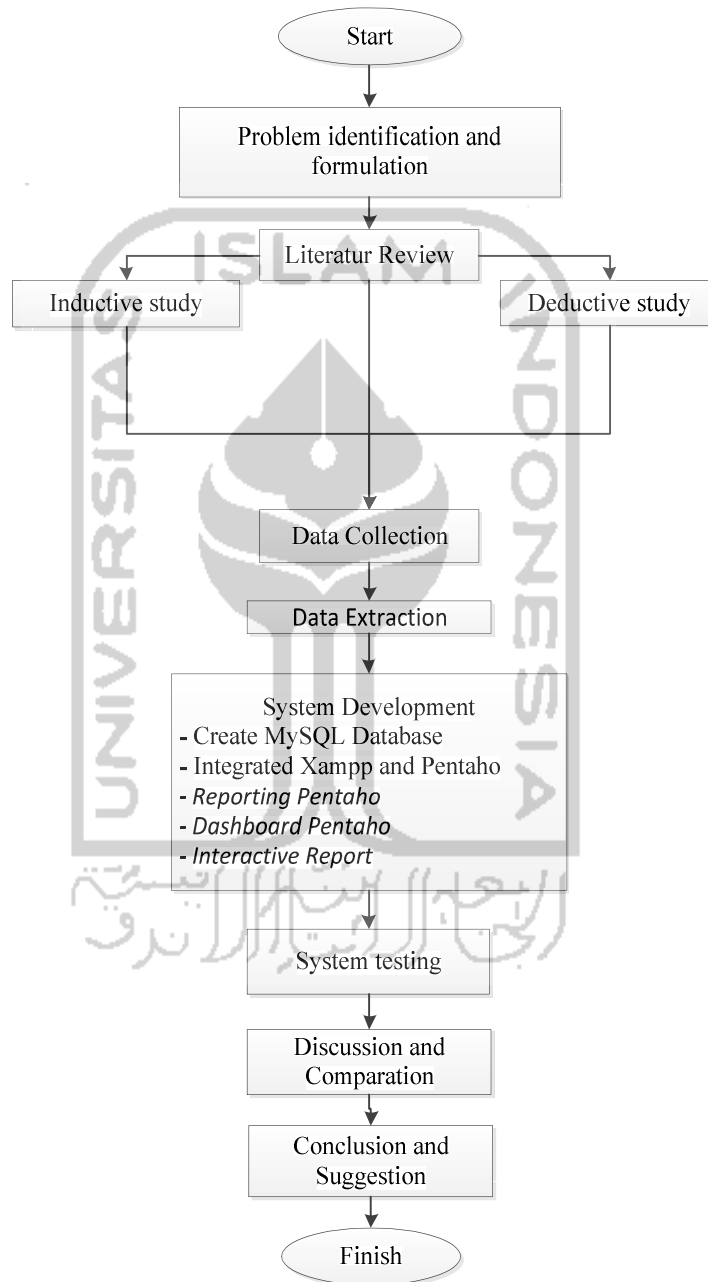


Figure 3.1 Research flowchart

### **3.4.1 Inductive Study**

This study is obtained from the journal, proceedings, seminars, magazines and so on. In this study also carried out development on the research conducted by previous research such as knowledge, research developments, limitation and shortcomings of the previous studies.

### **3.4.2 Deductive Study**

This study aims to establish a conceptual framework based on the reference contained in the book and related to ongoing research. This study also contained basic theory and related theory.

### **3.4.3 Problem Identification**

At this stage to identify problems in the company on the information system and process business in terms to analysis the flow process business in the company and determining database character, for data processing.

### **3.4.4 Problem Formulation**

Problem formulation from the identification problem in company and determine the process business.

### **3.4.5 Data Collection**

Data collecting use observation to get an initial data. This observation method is using interview and analysis data history which have in the database before included direct inspection method.

### **3.4.6 Data Extraction**

Data extraction is a step that should be done in order to choose data that needed by system build. This step also described what kind of data that can be extracted from company business process.

### **3.4.7 System Development**

After the data collected, the next step is to build systems that can improve the existing systems. System that built will allow decision makers to monitor the actual condition of the real system. From data collected, the database is created and then connects to Pentaho. Information that obtained from Pentaho will be input to decision makers. Data were taken between 2010 and 2011.

### **3.4.8 System Testing and Discussion**

At this stage the discussion of the data processing associated with studies of the journals related to this research problem. And the reference about base theoretical information will be

needed. System testing also performed in this stage to know if the system that already build representative or not.

### **3.4.9 Conclusion and Suggestion**

The final step of a study is conclusion. Conclusion is very useful in summarizing the final results of a study. This section also comes with some brainstorming to improve research results.



## CHAPTER IV

### CUSTOMIZING PENTAHO SYSTEM FOR BUSINESS

#### PERFORMANCE ANALYSIS

This chapter describes about the process of customizing Pentaho system. This chapter also describes from the beginning data extraction, database development, connecting database to Pentaho, making dashboard, interactive report, and analyzer report.

##### 4.1 Company Business Process

Basically, business process in the company did on several steps. To produce product, company need to spend some money to pay requirement cost. There are a lot of costs and aspect that should considered in order making BI modules. Business process of the company started with cost. Cost considered as production cost, setup cost, rework cost, inventory cost. Setup costs itself consist of machine setup, and electricity/energy cost. Rework cost consist of salary cost, and electricity cost. Production cost consists of raw material cost, salary cost, energy cost.. Besides of this cost, quantity of product, price, and name of product itself become main component of business process. Based on business process above, costs that can be concluded as shown in table 4.1 below.

Table 4.1 Data extraction

Cost						
Production Cost			Setup Cost		Rework Cost	
Raw Material	Salary	Energy	Machine Setup	Energy	Salary	Energy
Variable Cost	Fix Cost	Variable Cost	Variable Cost	Variable Cost	Fix Cost	Variable Cost

From table 4.1, a database can be developed and its design is shown in figure 4.2.

#### 4.2 Database Development

To make integrated system of BI and DBMS, database becomes the main component. Development of database commonly called as data warehouse. Basically data warehouse is integrating information from multiple different systems into a centralized data store, for example: integration of customer order, customer service, and customer marketing data into a centralized database. Below is the example of data taken from real system.

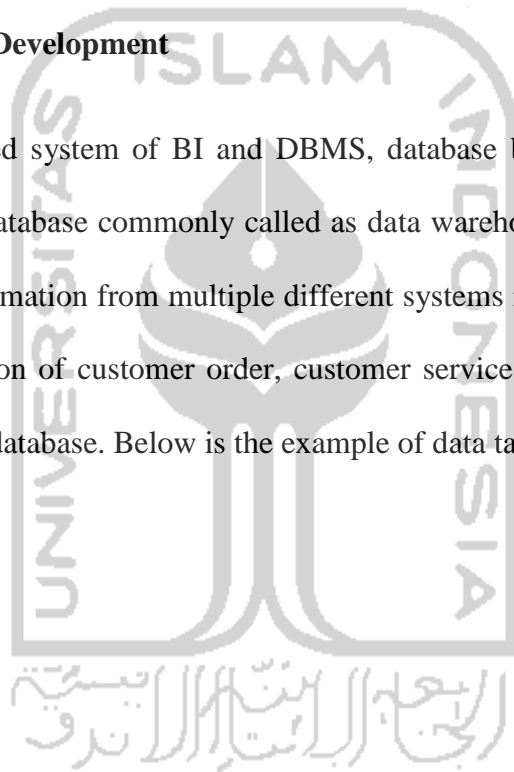


Table 4.2 Example data

Date	Product Name	Quantity	Price	Production Cost	Setup Cost	Rework Cost
Wednesday, January 06, 2010	Milling N 50 Black	112	34000	16719	3611	801
Wednesday, January 06, 2010	Milling N 70 Black	145	43000	17832	3611	529
Wednesday, January 06, 2010	Milling N 120 Black	53	66000	15204	3611	797
Wednesday, January 06, 2010	Ulir N 70 Black	30	55000	16784	3611	715
Wednesday, January 06, 2010	Iner Cylinder N 70	26	47500	16168	3611	805
Wednesday, January 06, 2010	Ulir N 120 Polish	37	67500	16131	3611	739
Wednesday, January 06, 2010	Cepit N 50	200	20000	16511	3611	867
Wednesday, January 06, 2010	Poley BI x 12 x 1	359	30500	15511	3611	605
Tuesday, January 26, 2010	Milling N 50 Black	119	42000	16706	4351	533
Tuesday, January 26, 2010	Milling N 70 Black	138	60000	17670	4351	553
Tuesday, January 26, 2010	Ulir N 70 Black	154	57500	16057	4351	895
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
Wednesday, September 07, 2011	Cepit N 70	180	22000	16413	4764	719

### 4.3.1 MySql

#### A. Creating MySQL Database

In order to make MySQL database, an additional application needed. This research using XAMPP version 1.7.2 which is free software that supports several operation systems and constitute compilation from several programs. The function of XAMPP as the stand alone server (localhost), which compiled from Apache HTTP Server program, MySQL database, Filezilla, Mercury, and language translation which written by PHP Program language. From the raw data that taken from real system then converted into database. In XAMPP there are 2 ways to inputting data, (1) input data 1 by 1 manually, (2) import data from other source. Importing data from other source perceived easier and faster. In this case, file with extension .csv is needed. This .csv file also as a backup data if there's unstable process happen in the computer. Figure 4.1 shows the ".csv" file.

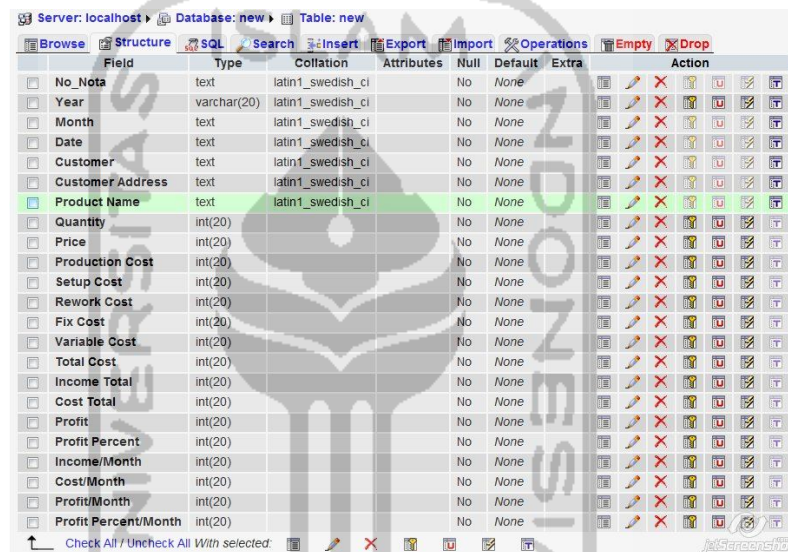


data - Microsoft Excel

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X						
1	No	Year	Month	Date	Customer	Product	N	Quantity	Price	Productio Setup	Co-Procure	C	Total Cost	BCR	100	Income	To Cost	Total Profit	Profit	Pen	Income	/A	Cost	Mon	Profit	/Mo	Profit	Percent	Month
2	1	2010	January	Wednesd	UD. Baht	Jl. Kupang	Milling N	112	34000	18719	3611	801	21181	1.60901	181	3808000	2366672	1441328	37	85	80157000	43291917	36865083	45.99					
3	2	2010	January	Wednesd	UD. Baht	Jl. Kupang	Milling N	145	43000	17832	3611	529	21972	1.957036	196	6235000	3185940	3049060	48	9023	80157000	43291917	36865083	45.99					
4	3	2010	January	Wednesd	UD. Baht	Jl. Kupang	Milling N	53	66000	15204	3611	797	19612	3.365287	337	3498000	1039436	2458564	70	28485	80157000	43291917	36865083	45.99					
5	4	2010	January	Wednesd	UD. Baht	Jl. Kupang	Ulir N	70	30	58000	16784	3611	715	21110	2.6054	261	1650000	633300	1016700	61	61818	80157000	43291917	36865083	45.99				
6	5	2010	January	Wednesd	UD. Baht	Jl. Kupang	merCyrin	26	47500	16168	3611	605	20584	3.207815	281	1235000	535184	699816	36	66526	80157000	43291917	36865083	45.99					
7	6	2010	January	Wednesd	UD. Baht	Jl. Kupang	Ulir N	120	37	67500	16131	3611	739	20481	3.285788	330	2487500	757797	1739708	69	65778	80157000	43291917	36865083	45.99				
8	7	2010	January	Wednesd	UD. Baht	Jl. Kupang	Capit N	54	200	20000	16511	3611	867	20989	0.54388	96	4000000	4197800	-197800	-4	945	80157000	43291917	36865083	45.99				
9	8	2010	January	Wednesd	UD. Baht	Jl. Kupang	Milling N	119	42000	19511	3611	605	19727	1.546104	195	10949500	7081993	3867507	35	32131	80157000	43291917	36865083	45.99					
10	9	2010	January	Tuesday	UD. Baht	Jl. Kupang	Milling N	119	42000	16705	4351	533	21590	1.945345	195	4988000	2869210	2428790	48	59524	80157000	43291917	36865083	45.99					
11	10	2010	January	Tuesday	UD. Baht	Jl. Kupang	Milling N	138	60000	17670	4351	553	22574	1.657925	266	2380000	3115212	5164788	62	37667	80157000	43291917	36865083	45.99					
12	11	2010	January	Tuesday	UD. Baht	Jl. Kupang	Ulir N	70	154	57500	16057	4351	895	21303	2.69915	270	8855000	3280862	5574338	64	9513	80157000	43291917	36865083	45.99				
13	12	2010	January	Tuesday	UD. Baht	Jl. Kupang	Ulir N	120	37	67500	16598	4351	888	21827	3.0925	310	2497500	807599	1689901	67	6637	80157000	43291917	36865083	45.99				
14	13	2010	January	Tuesday	UD. Baht	Jl. Kupang	Ulir N	120	92	62000	16760	4351	956	21867	1.874762	288	5704000	1984164	3719836	65	21452	80157000	43291917	36865083	45.99				
15	14	2010	January	Tuesday	UD. Baht	Jl. Kupang	Capit N	74	180	21000	15634	4351	550	20535	1.027644	108	3780000	3696300	83700	2714286	80157000	43291917	36865083	45.99					
16	15	2010	January	Tuesday	UD. Baht	Jl. Kupang	Policy Bl x	999	90500	15150	4351	451	20152	1.513497	152	21169500	8042648	4128952	33	92787	80157000	43291917	36865083	45.99					
17	16	2010	February	Monday	IUD. Baht	Jl. Kupang	Capit N	54	75	18500	17683	3721	793	22197	0.833246	84	1387500	1664775	-277276	-19	9838	38978000	22891405	16086595	41.27				
18	17	2010	February	Monday	IUD. Baht	Jl. Kupang	Capit N	74	340	21000	16235	3721	533	20489	1.02494	103	7140000	6966260	173740	2	43333	38978000	22891405	16086595	41.27				
19	18	2010	February	Monday	IUD. Baht	Jl. Kupang	Ulir N	120	37	67500	16680	3721	522	20323	3.32186	333	2497500	751951	1745549	69	89185	38978000	22891405	16086595	41.27				
20	19	2010	February	Monday	IUD. Baht	Jl. Kupang	Milling N	45	34000	16200	3721	883	20784	1.635874	164	1530000	935280	594720	38	87059	38978000	22891405	16086595	41.27					
21	20	2010	February	Monday	IUD. Baht	Jl. Kupang	Milling N	55	43000	15082	3721	822	19677	2.196455	220	2385000	1078785	1288265	54	47209	38978000	22891405	16086595	41.27					
22	21	2010	February	Monday	IUD. Baht	Jl. Kupang	Milling N	128	66000	15891	3721	749	20961	3.241491	325	8443000	2605208	5841792	69	15	38978000	22891405	16086595	41.27					
23	22	2010	February	Monday	IUD. Baht	Jl. Kupang	Milling N	48	42500	17280	3721	599	21600	1.967593	397	2040000	1036800	1003200	49	17647	38978000	22891405	16086595	41.27					
24	23	2010	February	Monday	IUD. Baht	Jl. Kupang	Ulir N	120	92	62000	15050	3721	546	19977	3.212935	322	5704000	1753324	3928676	68	87581	38978000	22891405	16086595	41.27				
25	24	2010	February	Monday	IUD. Baht	Jl. Kupang	Policy Bl x	276	28500	17767	3721	534	22022	1.29446	130	7866000	6078072	1787928	22	72982	38978000	22891405	16086595	41.27					
26	25	2010	March	Wednesd	UD. Baht	Jl. Kupang	Capit N	54	35	18500	17003	3866	904	21773	0.849676	85	647500	762055	-114555	-17	6919	67731500	43330469	24401031	36.03				
27	26	2010	March	Wednesd	UD. Baht	Jl. Kupang	Capit N	74	336	21000	16329	3866	873	21068	0.996772	100	7056000	7078848	-22848	-0	32381	67731500	43330469	24401031	36.03				
28	27	2010	March	Wednesd	UD. Baht	Jl. Kupang	Capit N	111	24500	16566	3866	518	20950	1.699451	117	5169500	4420450	749050	14	4898	67731500	43330469	24401031	36.03					
29	28	2010	March	Wednesd	UD. Baht	Jl. Kupang	Milling N	48	42500	16135	3866	539	20400	2.069133	207	2040000	985320	1054080	51	67059	67731500	43330469	24401031	36.03					
30	29	2010	March	Wednesd	UD. Baht	Jl. Kupang	Milling N	42	34000	16179	3866	690	20735	1.63974	164	1428000	870870	557130	39	01471	67731500	43330469	24401031	36.03					

Figure 4.1 Csv file raw data.

The first step to make database in XAMPP is defined the name of database, and the number of field. The number of field that use should be same as the number of column that use in .csv file. In this case, the number that needed is 15. Named the field same with name of column in .csv file. Figure 4.2 show the database named as Pentaho.



The screenshot shows the 'Structure' tab of a MySQL database in XAMPP. The table is named 'new' and contains 23 fields. The fields are listed in a table with columns for Field, Type, Collation, Attributes, Null, Default, Extra, and Action. The 'Product Name' field is highlighted in green.

Field	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/> No. Nota	text	latin1_swedish_ci		No	None		[Icons]
<input type="checkbox"/> Year	varchar(20)	latin1_swedish_ci		No	None		[Icons]
<input type="checkbox"/> Month	text	latin1_swedish_ci		No	None		[Icons]
<input type="checkbox"/> Date	text	latin1_swedish_ci		No	None		[Icons]
<input type="checkbox"/> Customer	text	latin1_swedish_ci		No	None		[Icons]
<input type="checkbox"/> Customer Address	text	latin1_swedish_ci		No	None		[Icons]
<input checked="" type="checkbox"/> Product Name	text	latin1_swedish_ci		No	None		[Icons]
<input type="checkbox"/> Quantity	int(20)			No	None		[Icons]
<input type="checkbox"/> Price	int(20)			No	None		[Icons]
<input type="checkbox"/> Production Cost	int(20)			No	None		[Icons]
<input type="checkbox"/> Setup Cost	int(20)			No	None		[Icons]
<input type="checkbox"/> Rework Cost	int(20)			No	None		[Icons]
<input type="checkbox"/> Fix Cost	int(20)			No	None		[Icons]
<input type="checkbox"/> Variable Cost	int(20)			No	None		[Icons]
<input type="checkbox"/> Total Cost	int(20)			No	None		[Icons]
<input type="checkbox"/> Income Total	int(20)			No	None		[Icons]
<input type="checkbox"/> Cost Total	int(20)			No	None		[Icons]
<input type="checkbox"/> Profit	int(20)			No	None		[Icons]
<input type="checkbox"/> Profit Percent	int(20)			No	None		[Icons]
<input type="checkbox"/> Income/Month	int(20)			No	None		[Icons]
<input type="checkbox"/> Cost/Month	int(20)			No	None		[Icons]
<input type="checkbox"/> Profit/Month	int(20)			No	None		[Icons]
<input type="checkbox"/> Profit Percent/Month	int(20)			No	None		[Icons]

Figure 4.2 XAMPP structure.

Figure 4.3 explained the type of data which is used in each field of data. This research is creating a transaction table which is named "Pentaho". The table "Pentaho" is created based on MySQL and will be connected with Pentaho. The table has 23 fields which come from business process before. Below is an explanation of the fields.

1. No\_Nota, No\_nota becomes a primary key in the table.No\_notaexplained about transaction code from customer and data type used is varchar data with maximum characters are 20.
2. Year, field explained about year of transaction year done by customer. This field is used as the data filter after connected with Pentaho. Data type that use in this field is varchar with maximum character is 5.
3. Month explained about month of transaction done by customer. This field is used as the data filter after connected with Pentaho. Data type that use in this field is text.
4. Date, Date field explained transaction date of customer.This field is more complete than year field, because it is explained day and date. Data type used in this field is Text, because time in each transaction not completely known and just to make clear time of transaction was done.
5. Customer Name, Customer Name field explained about the name of customer whose doing transaction. Data type used in this field is text.
6. Customer Address, Customer address field is explaineddetail address of customer whose doing transaction. Data type used in this field is text.
7. Product Name, Product Name in field explained product name ordered by customer. Data type used in this field is text.
8. Quantity, quantity explainednumber order of product. Data type used in this field is integer with maximum character is 20.

9. Price, price explained selling price for each product. Data type used in this field is integer with maximum characters is 20.
10. Production Cost, Production Cost described the product cost which are includes raw material cost, energy/electricity cost, staff salary cost. Data type used in this field is an integer with maximum characters is 20.
11. Setup cost, its described the setup cost that needed every time the worker need to setup the machine, equipment, etc. Data type that use in this field is an integer with maximum character is 20.
12. Rework cost, described as the cost that company should pay for every rework of reject product. Data type that use in this field is an integer with maximum character is 20.
13. Total cost, is the sum of production cost, setup cost, and rework cost. Data type that use in this field is an integer with maximum character is 20.
14. Fix Cost, describe the total fix cost that needed for every product. Data type used in this field is Integer with maximum characteristic are 20.
15. Variable Cost describe the total variable cost that needed for every product Data type used in this field is Integer with maximum characteristic are 20.
16. Income total explained about total selling price for each product which multiplied by order quantity. Data type that use in this field is an integer with maximum character is 20.

17. Cost total explained about total cost that needed for each product which multiplied by order quantity. Data type that use in this field is an integer with maximum character is 20.
18. Profit is the amount of income total minus cost total. Data type that use in this field is an integer with maximum character is 20.
19. Profit percent is amount of percentage of profit that gained for each product. Data type that use in this field is an integer with maximum character is 20.
20. Income/month explained about total income that gained by company each month. Data type that use in this field is an integer with maximum character is 20.
21. Cost/month explained about total cost that company should pay every month. Data type that use in this field is an integer with maximum character is 20.
22. Profit/month is the amount of income/month minus cost/ month. This data explained about total profit that gained by company for each month. Data type that use in this field is an integer with maximum character is 20.
23. Profit percent/month explained about percentage of profit that gained by company each month. Data type that use in this field is an integer with maximum character is 20.

After database was created, next step is filling the table with the collected data's. As mentioned before, there are 2 ways to export the data into MySQL database. Importing data step can be done after creating table and named it same as the column in .csv file. Figure 4.3 show the data that imported successfully.





30 rows(s) starting from record # 30  
 mode and repeat headers after 100 cells  
   Page number: 1

No.	Node	Year	Month	Date	Customer	Customer Address	Product Name	Quantity	Price	Production Cost	Setup Cost	Network Cost	Total Cost	BCR x 100 (Scale)	Income Total	Cost Total	Profit Total	Profit Percent	Income/Month	Cost/Month	Profit/Month	Profit Percent/Month	
1		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 70 Black	Milling N 50 Black	112	34300	10716	3011	801	21318	1.06570469	3036000	209672	1441328	38	80157000	43291917	36865083	46	
2		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 70 Black	Milling N 70 Black	145	43000	17632	3011	529	21972	1.957036228	196	4230000	318540	3448500	49	80157000	43291917	36865083	46
3		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 120 Black	Milling N 120 Black	63	60000	15204	3011	797	19612	3.360286059	337	3490000	1039436	2450564	70	80157000	43291917	36865083	46
4		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 70 Black	Milling N 70 Black	30	98000	10754	3011	718	21170	2.895420284	281	1650000	433300	1016700	82	80157000	43291917	36865083	46
5		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 70 Black	Milling N 70 Black	29	47000	19186	3011	806	20664	2.307671007	231	1200000	531154	678846	87	80157000	43291917	36865083	46
6		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 120 Black	Milling N 120 Black	87	67000	16131	3011	739	20481	3.260378543	335	2467500	757797	1709703	70	80157000	43291917	36865083	46
7		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 50 Black	Milling N 50 Black	200	20000	16511	3011	867	20989	0.95288008	96	4000000	4197800	-197800	-5	80157000	43291917	36865083	46
8		2010	January	Wednesday, January 06, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 70 Black	Milling N 70 Black	358	30500	18511	3011	855	20727	1.94614334	155	1254580	7081983	3807307	35	80157000	43291917	36865083	46
9		2010	January	Tuesday, January 26, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 50 Black	Milling N 50 Black	119	42000	16706	4351	633	21590	1.940340367	196	4960000	2698210	2423790	49	80157000	43291917	36865083	46
10		2010	January	Tuesday, January 26, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 70 Black	Milling N 70 Black	138	60000	17070	4351	603	22574	2.657650047	266	8280000	3118212	5161788	62	80157000	43291917	36865083	46
11		2010	January	Tuesday, January 26, 2010	UD, Bahra	Jl. Kupang Jaya (Surabaya) 70 Black	Milling N 70 Black	154	57000	16057	4351	696	21303	2.699150354	270	8655000	3260662	5574338	63	80157000	43291917	36865083	46



Figure 4.3 Imported data into XAMPP

### 4.3 Pentaho Development

#### 4.4.1 Connecting MySQL into Pentaho/BI Server

After data imported to the database, then connecting MySQL to Pentaho is the next step. Basically, Pentaho as open source software can be connected into many kind of database. Some step to connecting database to Pentaho listed as follow:

- a. Run MySQL and Pentaho. Address <http://localhost/phpmyadmin/> on browser to open MySQL, and <http://localhost:8080/pentaho/Login> to open Pentaho user console login page. After that login in the user console login page using “joe” as user name, and “password” as password for entering administrator page. Figure 4.4 show Home page on Pentaho user console login.



Figure 4.4 Pentaho user console home



- b. To connect database to Pentaho, a connection needed through both application. Choose “Create New” button to start create new connection, and new window will appear named Data Source Wizard. Figure 4.5 show Data Source Wizard window.

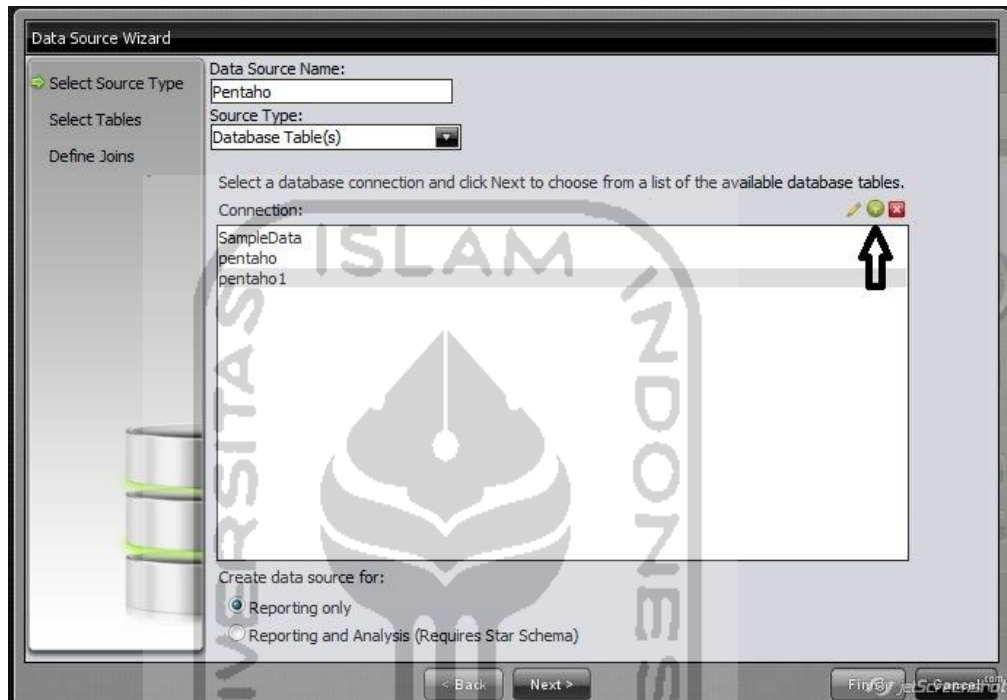


Figure 4.5 Data Source Wizard

Named on data source name as “Pentaho”, and click on *Add Connection* button that show with arrow on figure 4.6. After that new window named Database Connection will appear. In this window, the main information of connection needed. If information that put on the Database Connection are wrong, so connection couldn’t complete. Fill field with these information:

- i. Type *Pentaho* in *Connection Name* field.
- ii. Make sure that MySQL chooses on DatabaseType.

- iii. Fill Host Name field with localhost.
- iv. In Database Name fill withpentaho, should be same with XAMPP database name.
- v. On port number, type 3306. Its actually already filled if MySQL chooses on Database Type field.
- vi. On User Name field type root.

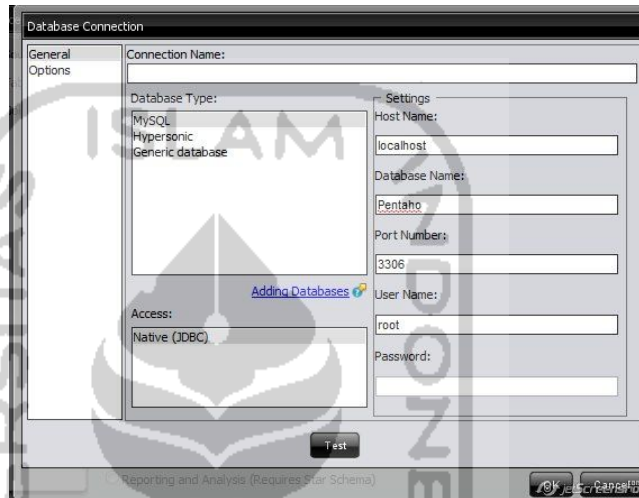


Figure 4.6 Database Connection

To try the connection button Test is use to test the connection before go to next step. Figure 4.7 show *Test Connection* window.



Figure 4.7 Test Connection

Return to *Data Source Wizard* window. Choose Pentaho, connection that just made and then put Pentaho from *Available Tables* to *Selected Tables* field, and Finish. New connection named Pentaho has been successfully created.

#### 4.4.2 Creating Smart Dashboard

Creating a dashboard in Dashboard Designer is as simple as selecting a layout template, theme, and the content that wanted to display. In addition to displaying content generated from action sequences, Interactive Reporting, and Analyzer, Dashboard Designer can also include:

- a. Charts: simple bar, line, area, pie, and dial charts created with Chart Designer.
- b. Data Tables: tabular data.
- c. URLs: Web sites that you want to display in a dashboard panel.

Dashboard Designer also has dynamic filter controls, which enables end-users to change a dashboard's details by selecting different values from a drop-down list, and to control the content in one dashboard panel by changing the options in another (content linking).

Below are the steps to make smart dashboard.

- a. On Pentaho user console home, choose *New Dashboard* button, new window will appear. Choose Template and Theme that wanted to apply. Then *Insert Content* to add new *Data Table*, *Chart*, *URL*, or *File*. This research use *Data Table* and *Chart* as main component in *Dashboard*. Figure 4.7 show Dashboard.

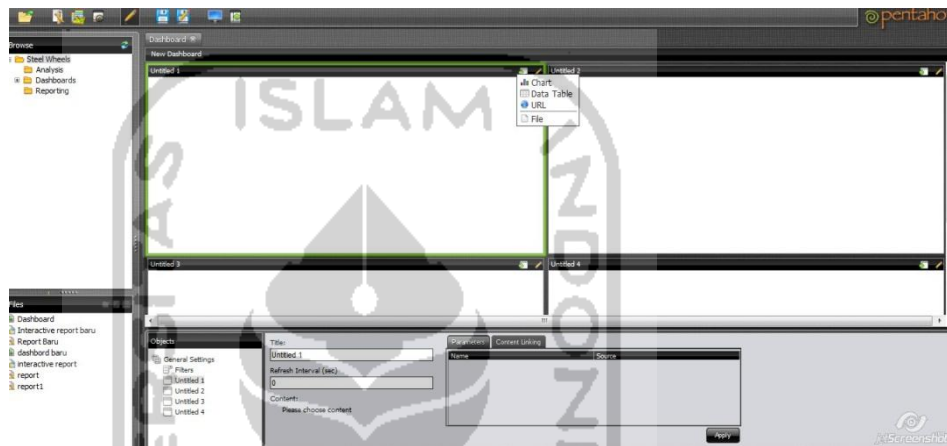


Figure 4.8 Dashboard

- b. Select Pentaho as Data Source.

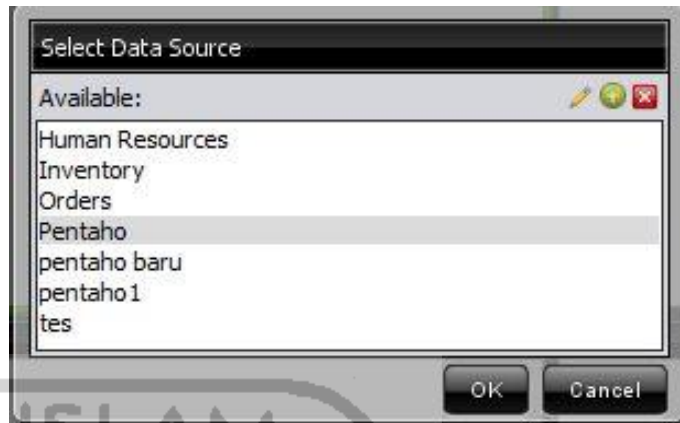


Figure 4.9 Select Data Source

- c. Fill the *Query Editor* window with below information: (1) *Selected Column* field with *Product Name, Quantity, Income Total, Cost Total, BCR, and Profit Percent* on *Query Editor Windows*. (2) *Conditionfield*, fill it with *Date. {date}* on *Value* field, and *Wednesday, January 06, 2010* on *Default* field.

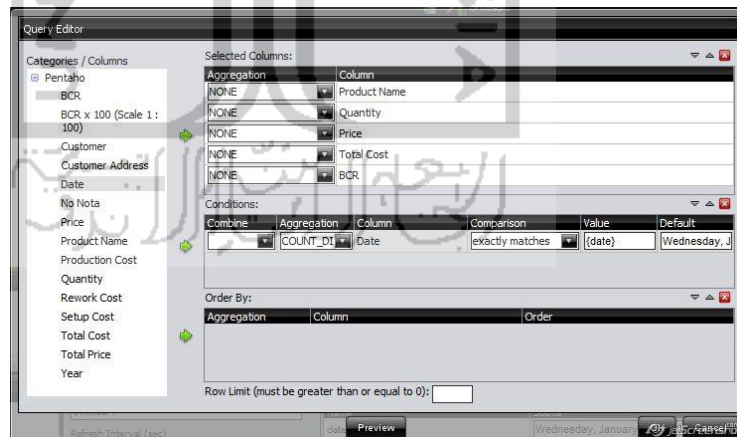


Figure 4.10 Query Editor.

d. On the next template, *Insert Content* and choose *Chart*. Repeat steps 2 and 3. Choose more columns this time on *Selected Column*. And fill the field with below information.

- i. Type is *Pie Chart*.
- ii. Themes are *Default*.
- iii. Series Column is *.Product Name*.
- iv. Category columns are *Quantity*.
- v. Value Column is *Quantity*.
- vi. Scale Is *None*.
- vii. Chart title is *Chart Quantity Product*.

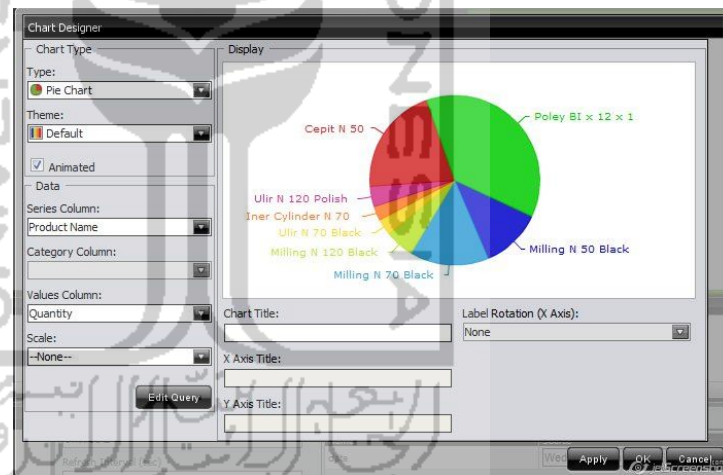


Figure 4.11 Chart Designer

e. Add more chart or pie or whatever wanted on template 3 and 4. The steps are similarly same. Figure 4.12 show complete fulfilled template.



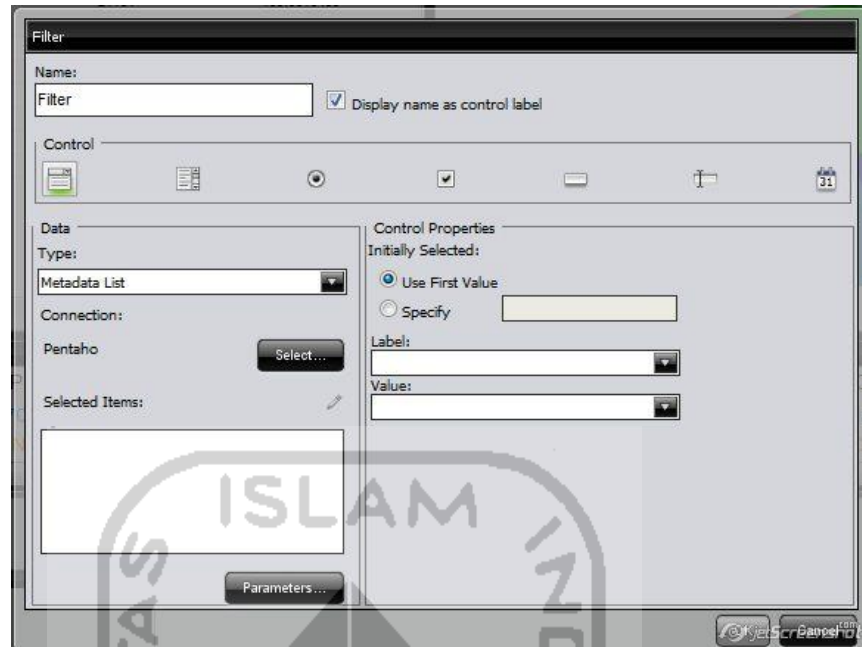


Figure 4.13 Filters.

- b. Click on Select button, and choose Pentaho as Data Source. Put Date on Selected Column, and click OK, and OK again.

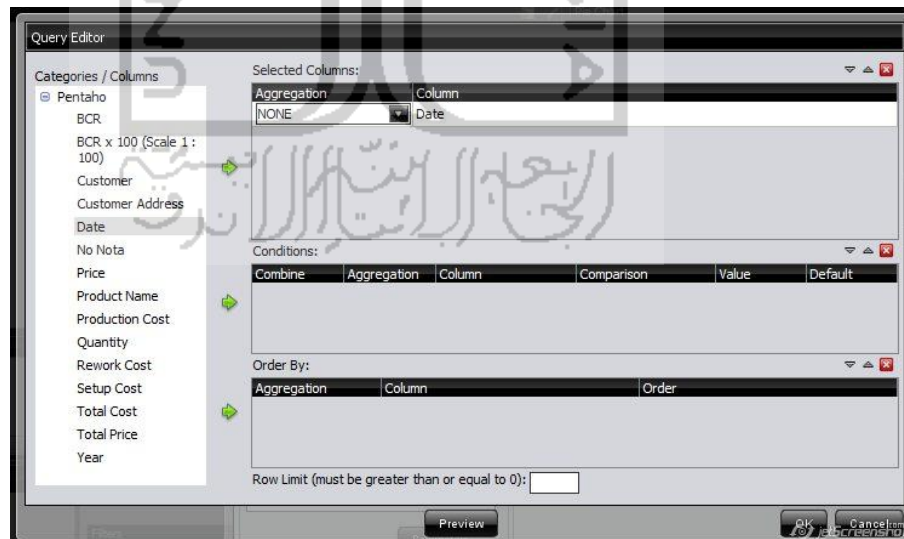


Figure 4.14 Filter query editor



- c. Now Filter has been added. Next step is connecting every template to Filter. Simply choose Filter on source on Parameter field, and click Apply.

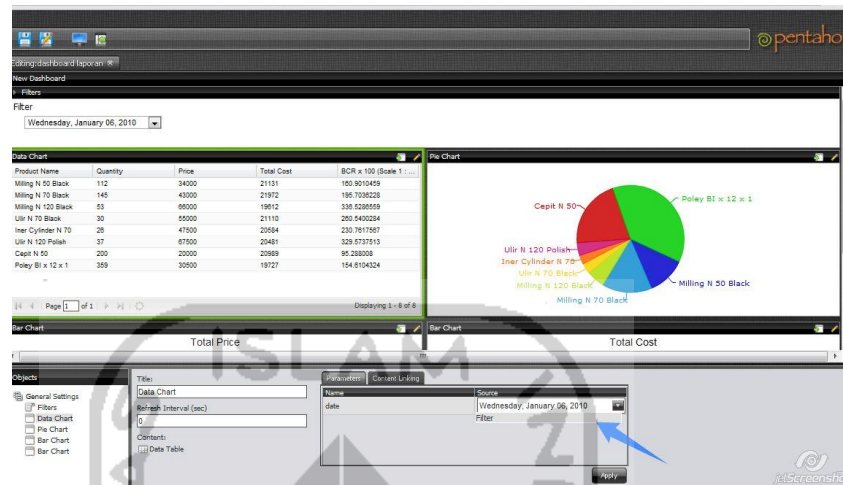


Figure 4.15 Connecting filter.

Do this for all templates. Now filter has been successfully added to Dashboard. Figure 4.16 show full Dashboard with Filter function.

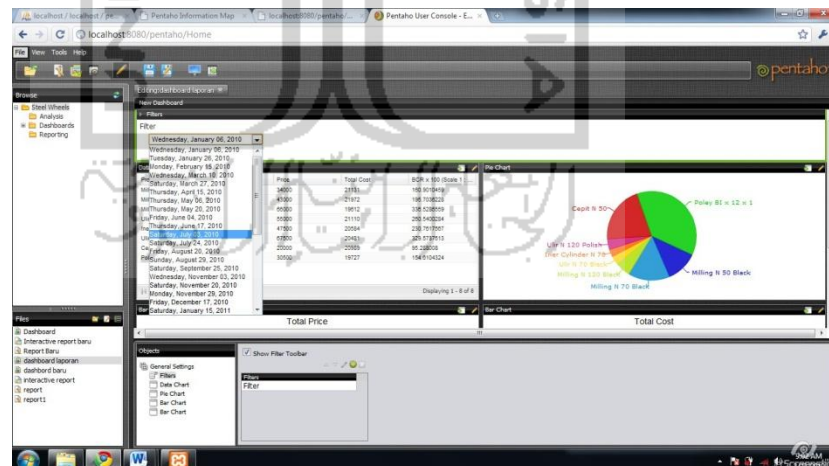


Figure 4.16 Filters on Dashboard

With this filter, user can easily search on what date that wanted to see. For example, user wanted to know data on Wednesday, January 06, 2010 so it's simply just click on filter and all data transaction included on that date will be displayed.

#### 4.4.4 Creating Interactive Report on Pentaho

Pentaho Interactive Reporting provides with a Web-based, drag-and-drop interface that allows user to add elements to the report layout quickly and easily. Among other things, common formatting features such as font selection, column resizing, column sorting, column heading renaming, copy/paste formatting, and unlimited undo/redo capability are available from the reports formatting menu and toolbar. The reports user create can be output as HTML, PDF, CSV or Excel files. Below are the steps to creating reporting on Pentaho.

- a. Choose New Report on Pentaho User Console Home, and select data source.
- b. Drag and drop data *Product Name*, *BCR*, *Income Total*, *Cost Total*, and *Profit Percent*. Then drag and drop date on the group layout. Save to specify folder and name the file.

Accounting Report CV Huda Karya  
Report per Product  
Month: April -  
Year: 2010 -

Product Name	BCR	Income Total	Cost Total	Profit Percent
Cept N 70	0.967920354	5040000	5207040	-3
Miling N 50 Polish	1.318887287	4319500	3275159	24
Miling N 70 Black	2.891705624	1800000	822470	65
Miling SB 10 Black	1.788887138	2412000	1347571	44
Poley Bl x 12 x 1	0.836474908	4082000	6413450	-57
Uir SB 10 Polish	1.748775857	1575000	900830	43

Year: 2011 -

Product Name	BCR	Income Total	Cost Total	Profit Percent
Cept N 50	0.854532032	4162500	4705875	-13
Cept N 70	1.017589766	9240000	9080290	2
Cept N 70	1.058458617	2200000	2078500	6
Iner Cylinder N 120	3.309066043	650000	196430	70
Iner Cylinder N 120	3.321919568	130000	39134	70
Iner Cylinder N 70	2.038632078	720000	353178	51
Iner Cylinder N 70	2.078866044	720000	346392	52
Iner Cylinder N 70	3.470975706	1475000	747405	63

Figure 4.17 Reporting on Pentaho.

#### 4.4.5 Creating Analyzer Report

Pentaho Analyzer is an interactive analysis tool that provides you with a rich drag-and-drop user interface, which makes it easy for user to create reports based on exploration of data. Unlike standard reports which tend to be static or minimally interactive after created, Pentaho Analyzer reports allow user to explore data dynamically and to drill down into the data to discover previously hidden details. Pentaho Analyzer presents data multidimensionality and allow user to select what dimensions and measures that wanted to explore. Use the Analyzer to drill, slice, dice, pivot, filter, and chart data and to create calculated fields. Data source for Analyzer Report is an OLAP data source. But in this research OLAP did not developed, so .csv file could use at this time. Below are the steps to create analyzer report:

- a. Choose New Analysis button on Pentaho User Console Home. Then choose Create Data Source, and choose CSV file as source type. Named Pentaho1 on data source name. Choose Import button, and choose .csv file. Figure 4.17 show Data Source Wizard after importing .csv file.

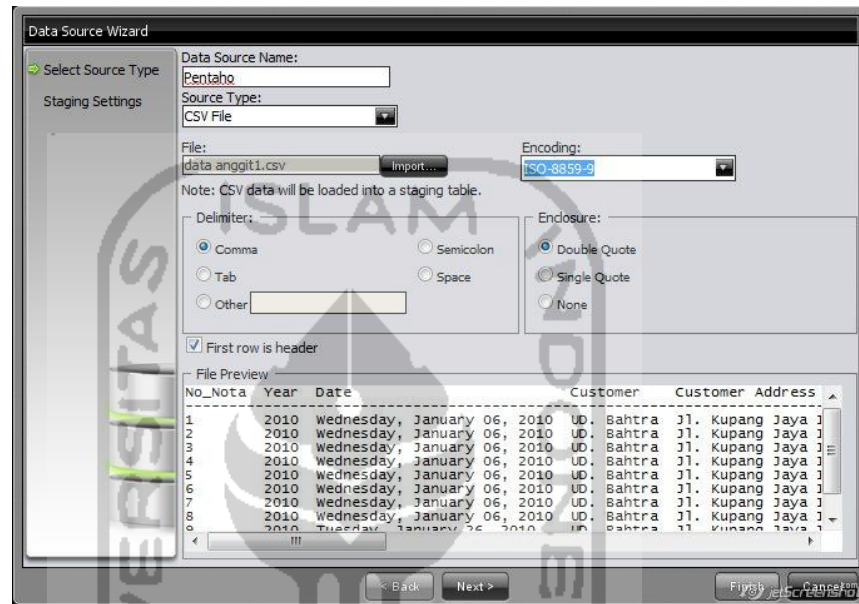


Figure 4.18 Analyzer report data source wizard.

- b. Choose Pentaho1 as data source. Analyzer report layer will appear. To make analyzer report, just drag and drop field that wanted to put on column. Figure 4.18 is an example of analyzer report that include *Date*, *Product Name*, *Month*, *Quantity*, *Cost/Month*, *Income/Month*, *Profit Percent*.

Month	Date	Product Name	Year			
			2010	2011		
			Quantity	Cost/Month	Income/Month	Profit Percent
April	Thursday, April 15, 2010	Polley 8L x 12 x 1	-	-	-	-
		Ulir N 120 Polish	-	-	-	-
		Ulir N 70	-	-	-	-
		Iner Cylinder N 70	-	-	-	-
		Cept N 70	240	5207940	5040000	-3
		Milling N 50 Polish	163	3275159	4319500	24
		Milling N 70 Black	30	622470	1800000	65
	Wednesday, April 06, 2011	Milling SB 10 Black	67	1247573	2412000	44
		Polley 8L x 12 x 1	34	6413450	4582000	-57
		Ulir SB 10 Polish	45	90630	1575000	43
		Cept N 50	-	-	-	-
		Cept N 70	-	-	-	-
		Iner Cylinder N 120	-	-	-	-
		Iner Cylinder N 70	-	-	-	-
		Milling N 120 Black	-	-	-	-
		Milling N 120 Polish	-	-	-	-
		Milling N 50 Benzol	-	-	-	-
		Milling N 50 Black	-	-	-	-
		Milling N 70 Black	-	-	-	-
		Milling N 70 Polish	-	-	-	-
		Milling SB 10 Black	-	-	-	-
		Polley 8L x 12 x 1	-	-	-	-
		Ulir ARM 1000 Black	-	-	-	-

Figure 4.19 Analyzer Report.

#### 4.4.6 Creating Filter on Analyzer Report

The function of filter on analyzer report basically is the same as interactive report, which is to specify data that users wanted to know. And report itself has a lot data, that's filter needed. Below are the steps in order to make filter on analyzer report.

- a. On analyzer report layer, drag a field that wanted to be filter parameter.

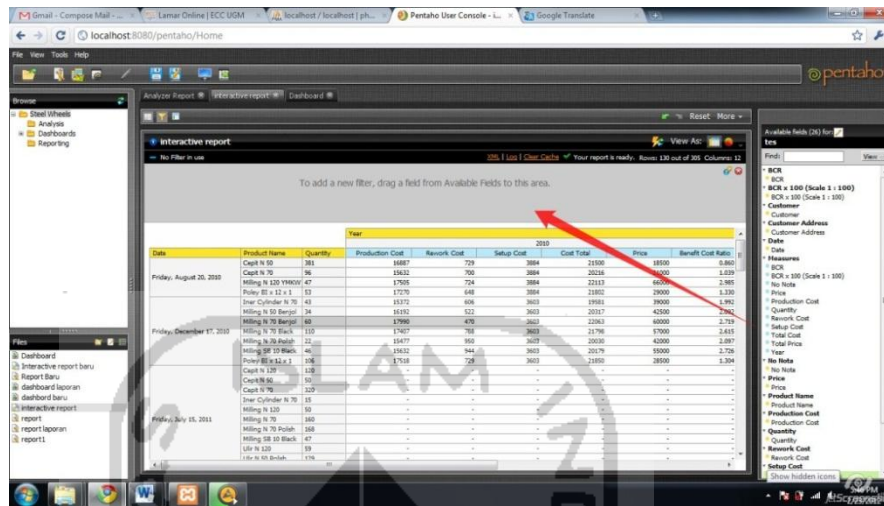


Figure 4.20 Analyzer report view

In Pentaho analyzer report, there are 2 kind of filter that can be use. (1) Filtering Text Field: Text fields contain non-numeric information, so user can choose to include or exclude certain values at will. Time Periods, Names, Types, and Categories are examples of text field groups. (2) Filtering Number Field: Number fields include numeric information. User can create a numeric filter using Greater/Less Than or Top Ten.

- b. To add Text Field filter, drag and drop Date field on filter layer, new window will appear named Filter on Date. There are 2 option to use this kind of filter, (1) Select From List, Pentaho will display a list of values, and user can choose to include or exclude certain values, (2) Match a Specific String, type in part of the name (string) that the name Contains or Does not Contain. Choose 1 value, and click OK. Figure

4.21 show Filter on Date and Figure 4.22 show filter that has been added to analyzer report.

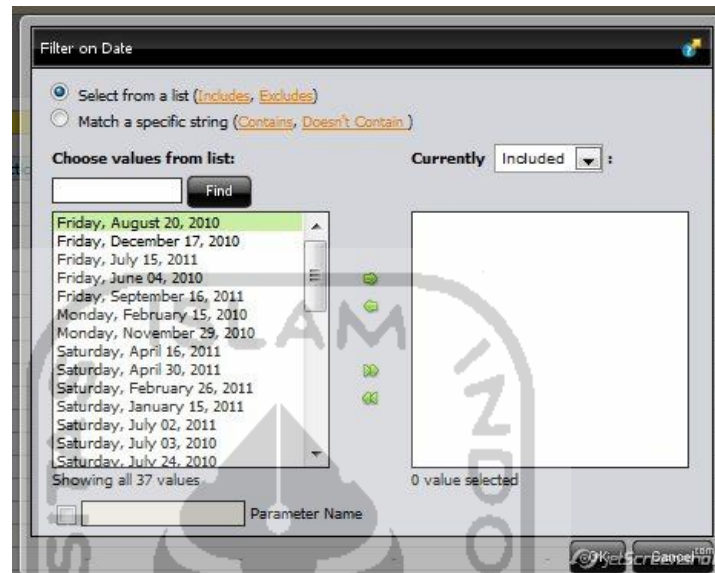


Figure 4.21 Filters on Date

Date	Product Name	Quantity	Production Cost	Network Cost	Setup Cost	Cost Total	Price	Benefit Cost Ratio
Friday, August 20, 2010	Cash N70	30	1687	72	384	2139	1000	0.842
Friday, August 20, 2010	Cash N70	36	1943	70	384	2394	2000	1.639
Friday, August 20, 2010	Spine 8.121 laptop	47	1706	24	384	2814	4000	2.861
Friday, August 20, 2010	Play 8.12.1.1	52	1729	64	384	2877	2900	1.330

Figure 4.22 Analyzer report with filter

- c. To add filtering number, drag and drop Quantity Field, new window will appear named Numeric Filter. In this field, user can choose filter parameter if it is



Greater/Less Than, Equal to, ect, or Top 10, etc. Figure 4.23 show Numeric Filter field, and Figure 4.24 show analyzer report with Numeric Filter.

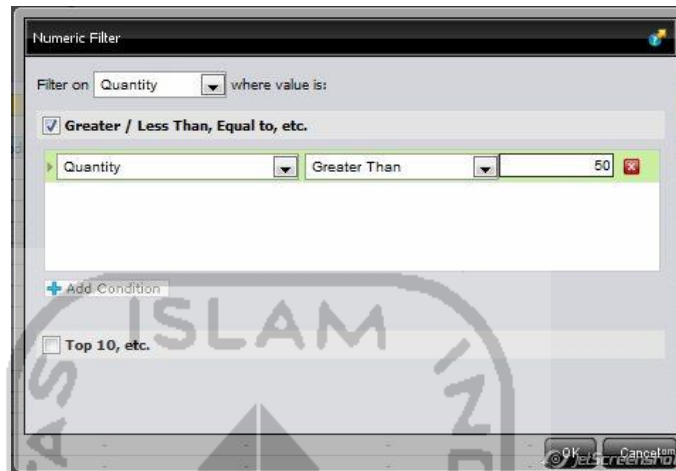


Figure 4.23 Numeric Filter

Date	Product Name	Quantity	Production Cost	Rework Cost	Setup Cost	2010	Qtr. Total	Price	Benefit Cost Ratio
Friday, August 20, 2010	Capit N 50	382	16887	729	3894	21500	18500	0.860	
Friday, August 20, 2010	Capit N 70	91	18632	750	3894	20000	20000	1.039	
Friday, August 20, 2010	Poloy BE 112 x 1	13	17270	646	3894	21000	20000	1.230	
Friday, August 20, 2010	Milling N 70 Back	60	17960	470	3603	20963	69000	2.719	
Friday, August 20, 2010	Milling N 70 Back	130	17467	788	3603	21768	17000	2.615	
Friday, August 20, 2010	Poloy BE 112 x 1	106	17318	729	3603	21850	20000	1.304	
Friday, August 20, 2010	Capit N 50	480	-	-	-	-	-	-	-
Friday, August 20, 2010	Capit N 70	300	-	-	-	-	-	-	-
Friday, August 20, 2010	Milling N 70	280	-	-	-	-	-	-	-
Friday, August 20, 2010	Milling N 70 Back	148	-	-	-	-	-	-	-
Friday, August 20, 2010	Capit N 120	93	-	-	-	-	-	-	-
Friday, August 20, 2010	Capit N 50	178	-	-	-	-	-	-	-
Friday, August 20, 2010	Capit N 120	80	17218	718	4042	22438	24000	1.083	
Friday, August 20, 2010	Capit N 50	175	15734	801	4042	21077	19000	0.901	
Friday, August 20, 2010	Capit N 70	200	18942	777	4042	20961	21000	1.007	
Friday, August 20, 2010	Milling N 50	146	18016	549	4042	21107	42000	2.014	
Friday, August 20, 2010	Milling N 70	291	14423	320	4042	21886	49000	2.263	
Friday, August 20, 2010	Poloy BE 112 x 1	124	11720	678	4042	20779	20000	1.214	
Friday, August 20, 2010	Capit N 50	180	-	-	-	-	-	-	-
Friday, August 20, 2010	Capit N 70	140	-	-	-	-	-	-	-
Friday, August 20, 2010	Milling N 70 Polish	120	-	-	-	-	-	-	-
Friday, August 20, 2010	Milling SR 10 Back	62	-	-	-	-	-	-	-

Figure 4.24 Analyzer Report with Numeric Filter



## CHAPTER V

### DISCUSSION

#### 5.1 Analyzer Report For Business Analysis

Analyzer report use to analyze business data quickly in an interactive environment that focused on the interaction, exploration, and visualization data. Analyzer report also provides advanced sorting and filtering data. However, this research does not developed database interface and OLAP schema data source, so analyzer report still use .csv file as it's data source, which means the data is static, not dynamic.

Analyzer report basically has same function with interactive report. But in analyzer report, user able to do more customizing and analyzing the layout and data. For example in analyzer report that made in this research is profit – loss scale that shows for month January 2010 the profit that get by company up to 46%, February 41%, March 36%, and so on. This information make the user easily found fluctuate from the data and help decision maker to make decision. Another example if user want to know about income and cost that spent by company for each month. In analyzer report shows the detail of data. Filter that implemented in analyzer report also help users to sort data, and shows what kind of data that user wanted to know.

Not only per month, but profit that get per product also can be shown in analyzer report dashboard. Example for product Cepit N50 on date Wednesday, January 06 2010 it shows the

profit is -5%. It means that company loss for product Cepit N 50. But for overall per month, company still gets profit up to 46%. Same with product Cepit N 50 on date Saturday, February 26, 2011 it shows -18% profit percent. But once again for overall month, company gets 38% profit. It means that overall profit per month can cover the loss of product Cepit N 50. Analyzer report dashboard also allow user to know detail about the data. Using filters, user can sort data into what wanted to know. For example in this research using 2 kind of filter, which are month and year. It makes user easily found out what data that wanted to know. If the filters change to year 2011 and month January, so analyzer report dashboard shows data only for month January and year 2011. But all of these information's only for supporting decision maker to make decision and decision maker should consider another factor because not all factor can be systemized.

## **5.2 Non Systemized Factor**

System is a complex thing, and this research only took several factors to be systemized. There are a lot of non systemized factor that excluded from this research, but it's also important to be discussed and become decision support factor. One of factor is human resources, in this case the worker. CV Huda Karya have 30 people that registered as worker. But in reality, there are only around 7 – 12 people that work daily. This is a problem also a factor that should be considered by decision maker. And also this factor cannot be systemized into Pentaho. The amount of intendant worker also varieties. This problem make decision maker hard to consider how much the production capacity daily.

Another factor that cannot systemize is weather. Weather in this case season, cannot be systemized. But in reality it's a factor that should be considered by decision maker. Bad weather not only affecting the production process, but also affecting the delivery of product and raw material. For example rain season will make the road become worse. This becomes obstacle for delivery process, which mean affected production system also.

### **5.3 Discussion**

As explained before, this research try to build new system that integrated BI tools and DBMS to create an efficient data analysis to help decision maker in order to make strategy based on historical data. Data that taken between year 2010 and 2011 with source of data is bill order from UD Bahtra, and direct interview from owner of CV Huda Karya.

After all data collected then performed extraction data to let us know what kind of data that needed. And then database created in order to connect with BI tools named Pentaho. Pentaho is building the future of business analytics. Pentaho's open source heritage drives continued innovation in a modern, integrated, embeddable platform built for the future of analytics, including diverse and big data requirements. Powerful business analytics are made easy with Pentaho's cost-effective suite for data access, visualization, integration, analysis and mining. Dashboard, Interactive Report, and Analyzer Report created in order to analyze data more deeply. However, this research are not developing OLAP scheme and only as decision supports system. It still depends on what human thinking and decision make based on

historical data and suggestion from another aspect. However, not all factors that affected production system has already mapped in this research.



## CHAPTER VI

### CONCLUSION AND SUGGESTION

#### 6.1 Conclusion

Customizing BI modules in order to create smart dashboard and report can help decision maker to analyzing business condition.

#### 6.2 Suggestion

For future research, several things can be developed in order to make new system more complex, like:

1. Data source that use can be change to OLAP schema, so the data that get from real time data, not historical and static data.
2. Add data mining tools, such as Weka to handle huge amount of data.
3. Add more factors that related with problem.

## REFERENCES

- Carina, Maria Roldan., (2010). “*Pentaho 3.2 Data Integration Beginner’s Guide: Explore, transform, validate, and integrate your data with easy*”, Packt Publishing. Brigmingham – Mumbai
- Cheung. CF, Li. FL, (2012). A quantitative correlation coefficient mining method for business intelligence in small and medium enterprise of trading business. *Expert Systems with Application*.
- David, Anthony Giornado., (2011). “*Data Integration Blueprint and Modeling: Techniques For a Scalable and Sustainable Architecture*”, IBM Press.
- Elbashir. Mohammed, Collier. Philip, Davern. Michael, (2008). Measuring the effect of business intelligence systems: The relationship between business process and organizational performance. *International Journal of Accounting Information Systems*. 9, 135 – 153.
- Gorman, Will., (2009). “*Pentaho Reporting 3.5 for Java Developers: Create advanced reports, including cross tabs, subreport, and chart that connect to practically any data source using open source Pentaho Reporting*”, Packt Publishing. Birmingham – Mumbai.
- Li Yan. Su, Wang. Ying, Cheng Liu. Ji, (2012). Research of the comprehensive evaluation of business process intelligence system based on BP neural network. 2<sup>nd</sup> *International Conference on Complexity Science & Information Engineering, System Engineering Procedia*. 4, 275 – 281.
- Pozzebon. Marlei, Petrini. Maira, (2009). Managing sustainability with the support of business intelligence: Integrating socio-environmental indicators and organizational context. *Journal of Strategic Information Systems*. 18, 178 - 191.

## APPENDICES

### Analyzer Report XML Definition

```
<report xmlns="http://www.pentaho.com" freezeRows="true" freezeColumns="true"
autoRefresh="true" version="5" showDrillLinks="false" emptyCellDisplay="-"
showEmptyCells="false" useNonVisualTotals="false" showColumnGrandTotal="false"
showRowGrandTotal="false" reportTypeEnum="PIVOT" cube="analysis"
catalog="analysis">
```

```
<title/>
```

```
<subtitle/>
```

```
<measures>
```

```
<measure id="[MEASURE:1]" sortOrderEnum="NONE"
measureTypeEnum="VALUE" showMin="false" showMax="false" showCount="false"
showAverage="false" showAggregate="true" showSum="false"
formula="[Measures].[Quantity]"/>
```

```
<measure id="[MEASURE:2]" sortOrderEnum="NONE"
measureTypeEnum="VALUE" showMin="false" showMax="false" showCount="false"
showAverage="false" showAggregate="true" showSum="false"
formula="[Measures].[Cost/Month]"/>
```

```
<measure id="[MEASURE:3]" sortOrderEnum="NONE"
measureTypeEnum="VALUE" showMin="false" showMax="false" showCount="false"
showAverage="false" showAggregate="true" showSum="false"
formula="[Measures].[Income/Month]"/>
```

```
<measure id="[MEASURE:0]" sortOrderEnum="NONE"
measureTypeEnum="VALUE" showMin="false" showMax="false" showCount="false"
showAverage="false" showAggregate="true" showSum="false"
formula="[Measures].[Profit Percent]"/>
```

```
</measures>
```

```
<columnAttributes>
```

```
<attribute sortOrderEnum="ASC" showSubtotal="false"
formula="[Year].[Year]"/>
```

```
</columnAttributes>
```

```

<rowAttributes>
  <attribute      sortOrderEnum="ASC"      showSubtotal="false"
formula="[Month].[Month]"/>
  <attribute      sortOrderEnum="ASC"      showSubtotal="false"
formula="[Date].[Date]"/>
  <attribute      sortOrderEnum="ASC"      showSubtotal="false"      formula="[Product
Name].[Product Name]"/>
</rowAttributes>
<filters>
</filters>
<filters>
  <chartOptions      legendFontFamily="Default"      labelFontFamily="Default"
legendStyle="PLAIN"      legendColor="#000000"      legendSize="12"
legendBackgroundColor="#ffffff"      labelStyle="PLAIN"      backgroundColorEnd="#ffffff"
maxChartsPerRow="3"      backgroundFill="NONE"      labelSize="12"      labelColor="#000000"
backgroundColor="#ffffff"      maxValues="100"      lineShape="CIRCLE"      lineWidth="2"
displayUnits="UNITS_0"      autoRange="true"      showLegend="true"
legendPosition="RIGHT"      showMultiChart="false"      chartType="VERTICAL_BAR"/>
</report>

```





## Analyzer Report

Month	Date	Product Name	2010				2011			
			Quantity	Cost/Month	Income/Month	Profit Percent	Quantity	Cost/Month	Income/Month	Profit Percent
April	Thursday, April 15, 2010	Capt N 70	240	520796	894000	3	-	-	-	-
		Milling N 50 Putih	163	3275159	4319500	24	-	-	-	-
		Milling N 70 Black	30	422470	1800000	65	-	-	-	-
		Milling 50 20 Black	67	1247673	2432000	44	-	-	-	-
		Polay 80 x 12 x 1	314	6423450	4862000	-57	-	-	-	-
Wednesday, April 06, 2011	Ulr 50 50 Putih	45	906630	1570000	43	-	-	-	-	
	Capt N 70	-	-	-	-	225	4765875	4462000	-13	
	Star Cylinder N 100	-	-	-	-	440	9060280	9240000	2	
	Star Cylinder N 70	-	-	-	-	10	194450	450000	70	
	Milling N 100 Putih	-	-	-	-	70	1452535	3150000	108	
	Milling N 70 Black	-	-	-	-	23	476284	1840000	74	
	Milling N 50 Putih	-	-	-	-	34	460384	1485000	68	
	Milling N 50 Bengali	-	-	-	-	100	219500	400000	50	
	Milling N 70 Black	-	-	-	-	125	274250	532000	49	
	Milling N 70 Bengali	-	-	-	-	20	195800	1720000	65	
Friday, August 26, 2010	Milling N 70 Putih	-	-	-	-	103	2047311	437500	53	
	Milling 50 20 Black	-	-	-	-	229	4491605	9099000	100	
	Polay 80 x 12 x 1	-	-	-	-	326	767334	974000	27	
	Ulr 80 x 1000 Black	-	-	-	-	13	262880	1367000	78	
	Capt N 50	261	891100	734800	-68	-	-	-	-	
Sunday, August 29, 2010	Capt N 70	96	2045000	2046000	4	-	-	-	-	
	Milling N 100 Putih	47	959931	3102000	66	-	-	-	-	
	Milling N 50 x 12 x 1	53	1255006	1517000	25	-	-	-	-	
	Milling N 200 Bengali	18	377514	1330000	72	-	-	-	-	
	Milling N 100 Black	138	2642480	7920000	62	-	-	-	-	
Milling N 50 Bengali	84	1741712	3070000	51	-	-	-	-		
Milling N 70 Black	174	1883164	7790000	63	-	-	-	-		

## Analyzer Report Dashboard

Month	Date	Product Name	2010			
			Quantity	Cost/Month	Income/Month	Profit Percent
May	Thursday, May 06, 2010	Capt N 70	199	431270	4379000	-5
		Milling N 100 Putih	40	812461	2830000	70
		Milling N 50 Putih	136	2769860	3036000	22
		Milling N 70 Putih	103	2223399	4420000	58
		Milling 50 20 Black	40	462761	1570000	40
		Polay 80 x 12 x 1	120	2423480	3540000	32
		Ulr 50 50 Putih	40	812461	1570000	40
		Capt N 70	340	6973000	7140000	2
		Star Cylinder N 70	80	1611705	3400000	53
		Milling N 100 Putih	120	2423399	2870000	44
Thursday, May 26, 2010	Milling N 80 Putih	60	1310854	2074000	37	
	Milling N 70 Putih	66	1354624	2120000	35	
	Milling N 70 Bengali	66	1354624	2120000	35	
	Polay 80 x 12 x 1	206	4168214	6077000	30	