Implementing Inventory Maintenance

And Analyze System For Manufacturing Company

By

Mohd Ikhwan Bin Ridzuan

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Information Communication and Technology)

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Universiti Teknologi PETRONAS

Bandar Seri Iskandar

31750 Tronoh

Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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A project dissertation submitted to the

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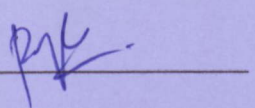
Approved by,



(Rozana Bt Kasbon)

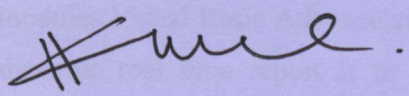
UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JANUARY 2012

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



MOHD IKHWAN BIN RIDZUAN

ABSTRACT

The main purpose of this project is to reduce time taken for monthly inventory report generating and avoid human intervention with data in a secured environment. This project is to develop an inventory solution system which includes several modules for implementations which are HFS server inventory data gathering, Visual Basic Advance automate program, dynamic real time report, and information protection. The issues with current inventory management process are including not having standardized platform for report gathering, manual report fixing, delayed in report generated and fragility of information leakage. As a result the idea to develop these modules can be a crucial business tool system whereby focusing on inventory (finished goods) as a primary purpose. HFS server is used as standard platform for inventory data gathering. The modules Visual Basic Advance automate program is to solve human interference with data while dynamic real time report is to solve time consumption in report preparation. The platform involves are Microsoft Office Excel 2007 and Microsoft Office Access 2007. On top of that, information protections which are really crucial in avoiding information leakage have been emphasizing through implementation of password protection module in several area. In this inventory solution system, there are three (3) areas which are been set up to have password protection. The first area is for manufacturing's customers to drop their data, the second area is for system analyst to use Visual Basic Advance automate program and the last area is for manager to view the report. The succession to develop this project enables an effective work environment in term of reduction in time spent to complete tasks and human intervention with data.

ACKNOWLEDGEMENT

Alhamdulillah, thanks to Allah SWT with His willing, I have successfully completed the Final Year Project (FYP) entitle 'Implementing Inventory Maintenance and Analyzing System for Manufacturing Company' and with His blessing I managed to accomplish the task within the time after facing some difficulties in doing the project. Special thanks to Madam Rozana Bt Kasbon, my FYP supervisor who guided and supported me while working on this project. Her guidance, supervision, and supports truly help the progression and smoothness of the project given. The cooperation from her is indeed appreciated. This project could not be done proficiently if there is no great assistance from her. And not to forget, most gratitude to my parents and friends who willing to give spiritual assist and work together with me while carrying out the task. The knowledge and information shared really assisted me in completing the project. Their contribution is highly treasured. Last but not least, thanks again to everyone who keenly helped and supported me until I had completed the course in sensation. I really appreciated everyone's contribution and may god bless all of us.

Thank you

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CHAPTER 1
INTRODUCTION

1.1 Project Background

Based on Investopedia inventory is refer to the raw materials, work-in-process goods and completely finished goods that are categorized to be the partial of a business's assets that are ready or will be ready for sale. Inventory is one of the most important assets that most businesses possess, because the turnover of inventory represents one of the primary sources of revenue generation and subsequent earnings for the company's shareholders. In this project, the term of inventory is referring to the finished good.

This research is based on case study conducted in Johnson & Johnson. The selection of Johnson & Johnson to be the primary resource of research is due to few factors which are:

- Johnson & Johnson customers are varied in term of their company size and background.
- Johnson & Johnson is listed as one of the Fortune 500 companies.
- Johnson & Johnson has more than 50 years' experience in Malaysia manufacturing sector.
- Euro monitor International, the world leader in strategy research for consumer markets stated that in the year 2010, Johnson & Johnson conquered 63% of value sales in Malaysia baby's product.
- J&J have various products in the market such as Listerine, Stayfree, Neutrogena, and Baby powder.

In general, it is possible to assume that most of the manufacturing company in Malaysia are using inventory process mirroring are implemented in Johnson & Johnson. It is crucial for author to clarify the inventory process based on process undergo by system analyst. In short, the depict process will not cover the daily process of supply and demand happened between manufacturing company and their customers as they are using Business-to-Business (B2B) system. In order to understand the inventory processes managed by system analyst, the figure 1.1 depict the step by step of inventory process take place in Johnson & Johnson.

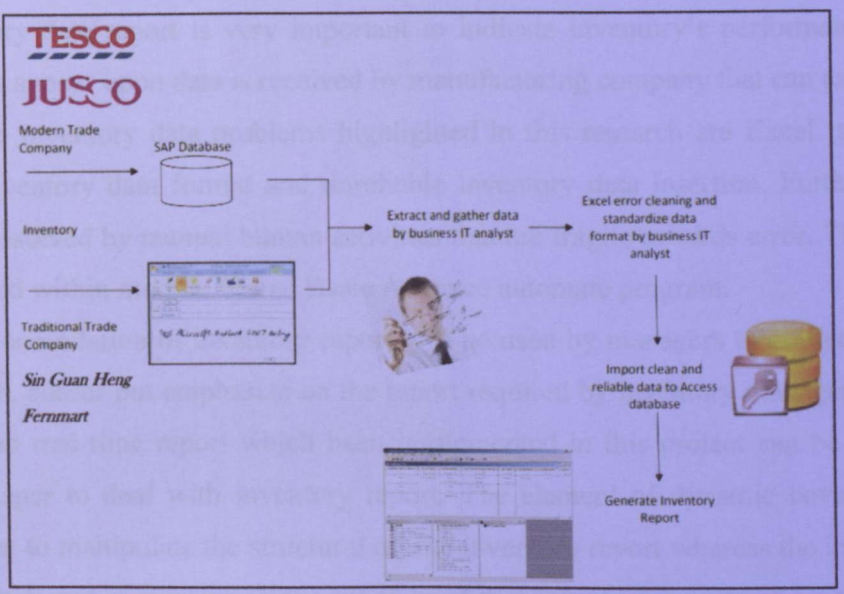

Figure 1.1: Johnson & Johnson current inventory process

Manufacturing company produces product that aim to be distributed to traditional and modern company. Traditional company is referred to product distributor that engaged with manufacturing company. This traditional company take products directly from manufacturing company and distribute those products to small scale company or personal shop. Meanwhile, modern company is referred to big scale companies like Jusco, Tesco, and Giant. The products obtained by traditional and modern company which to be sold for users' consumption are called inventory. Inventory is the value of goods possess by organization for sale like merchandise, finished goods, and spare parts (Business Dictionary, 2011).

Manufacturing company will know the report on monthly products' status like how many have been sold and how many remain based on the report sent by the traditional and modern company. Referring to the case study conducted in Johnson & Johnson, traditional company will send the report in form of excel sheet through email. However, modern company has better technology whereby all report will be kept in their temporary database and from that, the information will be sent to manufacturing company in excel sheet directly to manufacturing database system. In Johnson & Johnson, information sent by modern company will be stored in a system called System, Application, and Procedure (SAP) database. These two ways of data gathering will be solved through first module which is HFS server inventory data gathering.

Inventory data report is very important to indicate inventory's performance. However, some problems appear upon data is received by manufacturing company that can cause data to be unreliable. The inventory data problems highlighted in this research are Excel technical issue, variation in inventory data format and unreliable inventory data insertion. Furthermore, those problems are resolved by manual human activities that are fragile towards error. These problems will be managed within module Visual Basic Advance automate program.

The compilation of inventory report will be used by managers to do decision making. In this research, author put emphasize on the report required by inventory manager. The element of dynamic and real time report which been implemented in this project can be an alternative ways for manager to deal with inventory report. The element of dynamic cover on step that allows manager to manipulate the structural of the inventory report whereas the intention of real time element is to put emphasize on the speed level that inventory report can be generated upon data are successfully pumped into the database.

1.2 Problem Statement

Technologies become more essential and important to people in all over the world especially in today's rapid development. Technologies solve difficulties, save time, and help human in their daily life. In industries, better technologies are very helpful in producing more products, tracking products movement and gain more profit. Based on the current Johnson & Johnson inventory process, author would like to highlight few inefficient processes that are based on two (2) main indicators which are time consuming and human intervention. These indicators are parallel to the general purpose of this project which to enhance the effectiveness of current inventory process. In this research, even though Johnson & Johnson has applied advance system to manage their inventory management process, there are still rooms for improvement that can speed up the level of performance. Figure 1.2 depicts the problems and areas (highlighted in red) which author intends to improve.

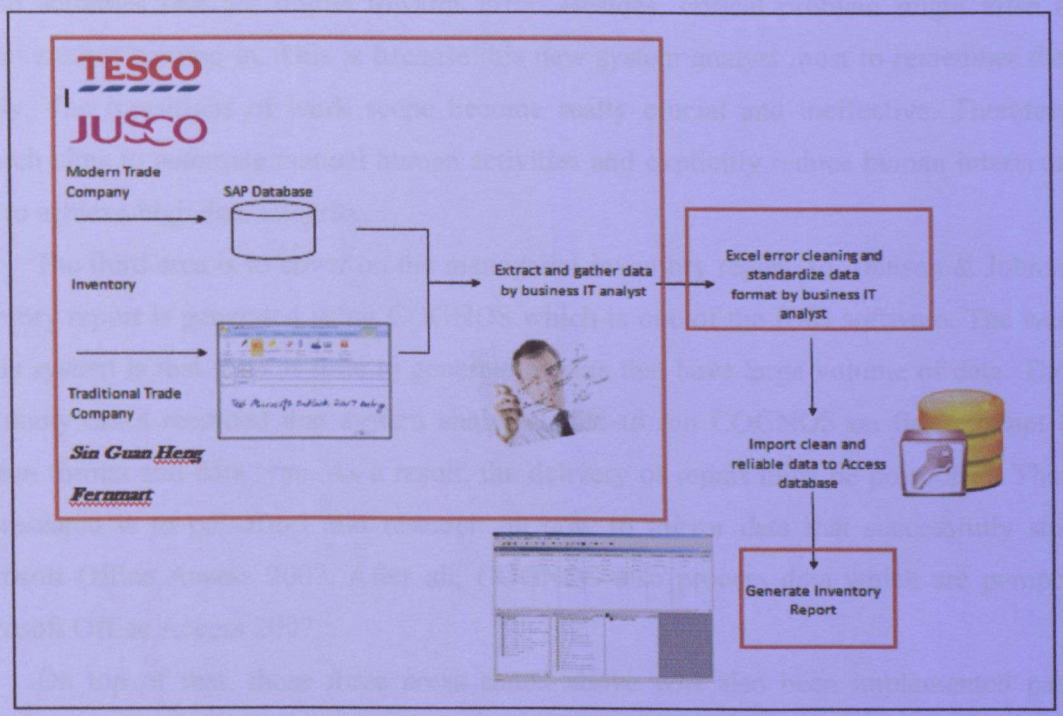

Figure 1.2: Area for improvement

The first area showed that there are two (2) difference ways used by Johnson & Johnson customer to send their inventory report. The issue with this system is that, there are two (2) places where system analyst needs to do the data extraction. The problems are arising from the traditional company. This is because their ways of sending the inventory report are through Microsoft Outlook. The function of Microsoft Outlook is similar with other common emails provider such as Google mail and Yahoo mail. As a result, system analyst needs to open each email sent by Johnson & Johnson customers and extract their report accordingly. Time consumption and wrong report extraction are among issue arises from this current inventory report gathering. Therefore, an alternative way of sending and consolidate report is introduced under this project. The proposed way is that to implement a standards platform for report gathering.

The second area show the problem faced by system analyst to alter the report accordingly as per specified by Microsoft Office Access 2007 table and query (J&J current database). The alterations involve activities such as deletion of hidden characters, re-arrange column position, re-defined column format, and import consolidated report to the database. This process involves

human activities that are fragile towards error. Besides, critical problem might arise if new system analyst coming in. This is because this new system analyst must to remember the steps clearly. The transitions of work scope become really crucial and ineffective. Therefore, this research aims to automate manual human activities and explicitly reduce human intervention in term to achieve high data integrity.

The third area is to cover on the managerial inventory report. In Johnson & Johnson, the inventory report is generated using COGNOS which is one of the IBM software. The weakness of this system is that it takes time to generate reports that have large volume of data. There are also many cases recorded that system analyst failed to run COGNOS on first attempt due to unclean format and data type. As a result, the delivery of report must be postponed. Therefore, this research is to put effort and research on how to mirror data that successfully stored in Microsoft Office Access 2007. After all, COGNOS also process data which are pumped into Microsoft Office Access 2007.

On top of that, those three areas stated above will also been implemented password protection to serve sensitive and confidential data. The first password protection would be for Johnson & Johnson customers. This is to avoid fake data been sent by irresponsible party. The second password protection will be implemented in Visual Basic Advance automate program. This is to avoid other party than system analyst used the program unethically. The last area that will be implemented with password protection is for report viewing. As inventory report is very sensitive and confidential, therefore only authorize personnel will gain the access to view the content of inventory report. Table 1.1 is the summarizing of problems detected for enhancement purpose.

Problems	Solutions
Two ways of inventory data sent to J&J by Customers	Introduce hybrid process by synchronizing the ways of data sending and consolidate
Time consumption in data consolidation	
Technical and information errors	Automate human manual process using programming defined function
Non-standard data type and format sent by customers	
Time consumption in report generated	Create dummy and dynamic view to data consolidated in the database for the managerial decision making
Static report generated	
Inventory confidential issue	Implement password protection to confidential and sensitive data

Table 1.1: Problems and solutions

1.3 Relevancy of project

Basically, this project is to address listed problem and enable the process to be effective at optimum level. By implementing this project, the significances results according to project's relevancy are:

- Ease of data consolidation by implementing standard platform for report process
- Avoid human intervention by implementing systematic ways of handling data
- Dynamic real time inventory report for managerial purpose
- Reduce time consumption
- Manage sensitive and confidential data issue

The figure 1.3 shows how extensive performance of current Johnson & Johnson inventory management can be achieved.

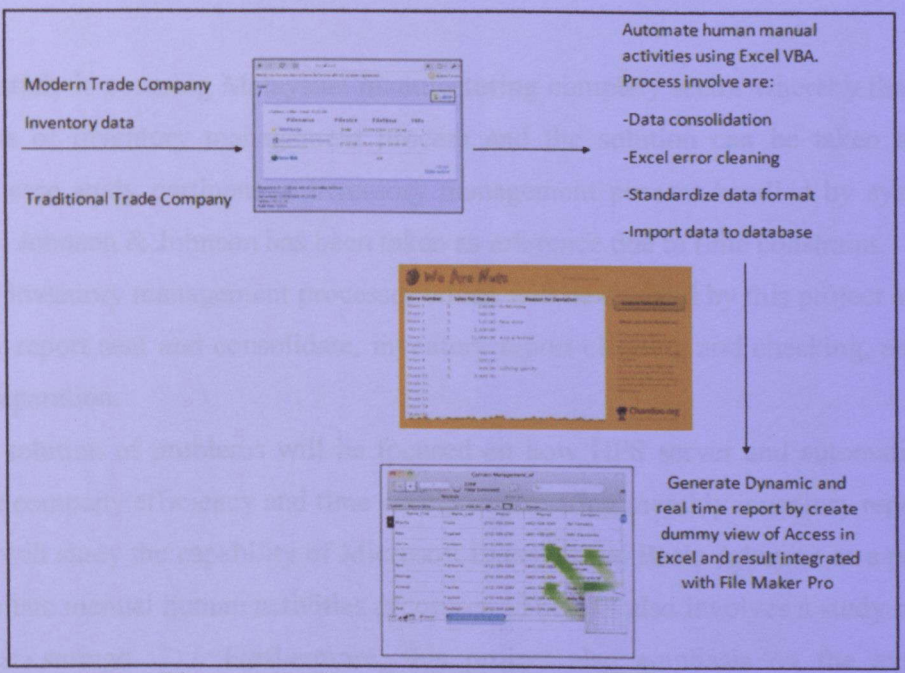

Figure 1.3: The result of enhancement process

1.4 Objectives

- To create a system that can manage current inventory process management effectively which include four (4) modules which are:
  - ✓ Module 1:

    To implement a standard processes by introducing standard platform for report gathering by using HFS server.
  - ✓ Module 2:

    To automate manual human activities in order to avoid human intervention and time consuming by using Microsoft Excel Visual Basic Advance.
  - ✓ Module 3:

    To implement dynamic and real time report by creating dummy view of Microsoft Office Access 2007 in Microsoft Office Excel 2007
  - ✓ Module 4:

    To implement password protection to serve sensitive and confidential data

1.5 Scope of Study

The study is covering Malaysian manufacturing company sector whereby the focus is on the problems of inventory management process and the solution can be taken to solve the problem. A case study pertinent to inventory management process handled by system analyst conducted in Johnson & Johnson has been taken as reference due to time constraint.

The inventory management processes which will be covered by this project are, the ways of inventory report sent and consolidate, inventory report cleaning and checking, and inventory reporting preparation.

The solution of problems will be focused on how HFS server and automation program can increase company efficiency and time saving in preparing monthly inventory report. Besides, this project will study the capability of Microsoft Excel Visual Basic Advance as a programming tool to automate manual human activities processes. There is also involves a study on Microsoft Access as data storage. Furthermore, this project also emphasis on the availability of password protection as a way to protect data confidentiality. An interactive interface is also one of main concern in this project as there is various degrees of IT literacy in a manufacturing company. This project will use Microsoft Excel Visual Basic Advance to develop an interactive interface to the users.

On top of that, a study on HFS server as a user friendly platform for Johnson & Johnson customers to drop their data is also taken into account in this project. The inventory report would only fulfill the usage of inventory manager purpose.

1.6 Feasibility Study

1.6.1 Market Feasibility

The system is aimed to be implemented at interested manufacturing company. Although the market is smaller, the system managed the inventory management problem in day to day manufacturing operation at low cost price. Besides, the newly introduced modules such as HFS server inventory reports gathering, Visual Basic Advance Automated Program, dynamic and real time inventory report would be the valuable features that can attract manufacturing company to

buy it. Furthermore, the integration of the system with Microsoft suite which already worldwide used can be the additional advantage as the manufacturing company does not need to put high investment to start using this program. The difference in age pertinent to degree of IT literacy would not be a major issue as its main screen interface is using a common office tool which is Microsoft Office Excel 2007.

1.6.2 Technical Feasibility

The HFS server report gathering will be developed using HFS server. The function of HFS server is same with Apache server that enables people to do the upload and download purpose. The concept of self-drop data inside this module was innovated using the idea of "DropBox" system which was successfully implemented worldwide. "DropBox" is a system that enables people to share big file which usually do not permitted by email. Meanwhile, data combining will be using Windows Command Scripting (CMD). This script will enable user to combine for example 10 or more Excel inventory report as one. The next process which is automated data cleaning and checking will be implemented using Microsoft Office Excel Visual Basics Advance and Microsoft Office Access 2007. Besides, the level of security has been taken into account by implementing password protection in order to ensure the data integrity and confidentiality. Furthermore, the generated inventory report wills also using Microsoft Office Excel as the platform who can mirror record in database for managerial inventory report.

1.6.3 Financial Feasibility

This project as a whole required a lot of financial assistance. However, as most of the application like Microsoft Office Suite is a must application to get office work done and the rest of application such as HFS server is open source software implicitly reduced the sky rocket cost. The only financial assistance required in this research is on project's trip for industry visit and expert advice. Besides, financial assistant is needed to accommodate the phase of testing and surveys. Even though this project having an ambitious objective whereby in general to be an inventory solution package to manufacturing company, this project is using various open source software which may lack in term of quality and security (Lawton, G. ,2002).

1.6.4 Time Feasibility

As this project takes less than one (1) years to be accomplished, certain constraints have been emphasizing. The inventory management process is based on the procedure handled by system analyst in J&J. Besides, Excel technical errors are based on reporting case as of case study period. Issues such as inconsistent data content and format pare based on records experienced by system analyst. The inventory report would only fulfill Inventory manager requirement. On top of that, the security emphasize would only cover the availability of password protection by ignoring the network security used to transfer data from one party to another. The timeline of this project can be referred at Appendix 1-1 and Appendix 1-2

CHAPTER 2
LITERATURE REVIEW

2.1 Human Intervention

In today competitive world, company strives to achieve excellence in order to stay longer as a business leader. As a result, tons of money has been used to adapt their company with high performance system (C. Delauney *et.al,* 2008). However, based on case study carried in Johnson & Johnson, there several activities pertinent to inventory management process still using manual methods that involve human intervention. As we are aware, human by their own are emotional containers which can lead the data towards error and mistake. Human intervention cannot be simply ignored as it will cause error in result prediction. Study has showed that human intervention is an effective factor that can cause error in data mining (Suwimon Kooptiwoot, 2010).There is many companies facing loses due to data error. The big amount of loses cause an aggressive move in research to find ways of getting accurate data. A.T. Kearney Inc loses $2 million for every $1 Billion amount of sales due to data inaccuracies. They predict to save $10 million per year if the data inaccuracies issues can be solved. This prediction has been used as motivational factor to do numerous investigations (C. Delauney *et.al,* 2008).

2.2 Technical issues

There are numbers of reason why manufacturing company having inaccurate data. One of them is because the technical issue due to Microsoft Excel spreadsheet itself. As spreadsheet have been accepted as standard minimum format for traditional and modern company in order to send inventory report, therefore manufacturing company need to bear the consequences which come together with this package. Spreadsheets can be highly prone to errors. In some documented instances, spreadsheet errors have cost organizations to bear millions of dollars in sales losses. The only to ensure the integrity of the data is by checking every of each data upon received it from traditional and modern company (Stephen G. Powel *et.al,* 2009). In this project, customer send sales and inventory report in CSV format which later converted into Excel format by

system analyst. The purpose of using CSV format is that customer wants the security of Transaction Processing to help protect their data set from network-related corruption (Knowledge Base, 2011). The CSV data needs to be converted into an organized and editable spreadsheet format upon received by manufacturing company. Since Microsoft Excel is the most common spreadsheet application, this presents an obstacle since Excel decides on its own how to format data when opening a CSV file. This is not favorable condition since the data integrity can be compromised. For example Excel usually truncates numbers over 15 digits, and may convert entries with dashes or slashes to date or time formats (risingline.com).

2.3 Microsoft Excel

Therefore this project aims to automate all human manual activities using Microsoft Excel Visual Basic Advance. The application will be using Excel programming script which is easy to understand for future reference in case of enhancement and maintenance. The tool is selected because of its popularity and user friendly design that can be learnt easily by any level of IT literacy. Besides, all inventory report sent by traditional and modern company are in Microsoft Excel format upon conversion by system analyst, so the best way to automate the process and do the data reliability checking is also using application in Microsoft Excel based platform. Individual Microsoft Excel macro programming can increase work efficiency (Lv Hongsheng, 2010). On top of that, Excel is a spreadsheet program that can organize data into lists and then summarize, compare, and present data graphically which really convenience for inventory reporting purpose (Hewen Tang, 2008).

2.4 Microsoft Access

In this project, Microsoft Access database will be used as storage for the inventory data. Database has become the standard minimum requirement technique for structuring and managing data in most of the organizations. One of the databases important in an organization is to support managerial decisions making (Mrutyunjaya Swain, 2002). Therefore it is important for mangers to have database content soonest as possible. However, the data in the database is really sensitive whereby cost of a single mistake can give a big impact to the data. The best way of providing manager with data is that through creation of dummy view. Instead of viewing the data directly

from database, it is safer to provide managers an Excel views as platform to monitor content inside the Access database. This method will allow manager to have data quickly without facing serious major issues. After all, in the area of information and communication technology, a wide variety of methods and tools are used for Processing and analyzing data (Kyi Pyar, 2010)

CHAPTER 3
METHODOLOGY

3.1 Project Methodology

This project is using methodology of Iterative and Incremental development. It is at the heart of a cyclic software development process developed in response to the weaknesses happened in waterfall model. It starts with an initial planning and ends with deployment with the cyclic interactions in between. The figure 3.1 shows how this methodology implemented in this project.

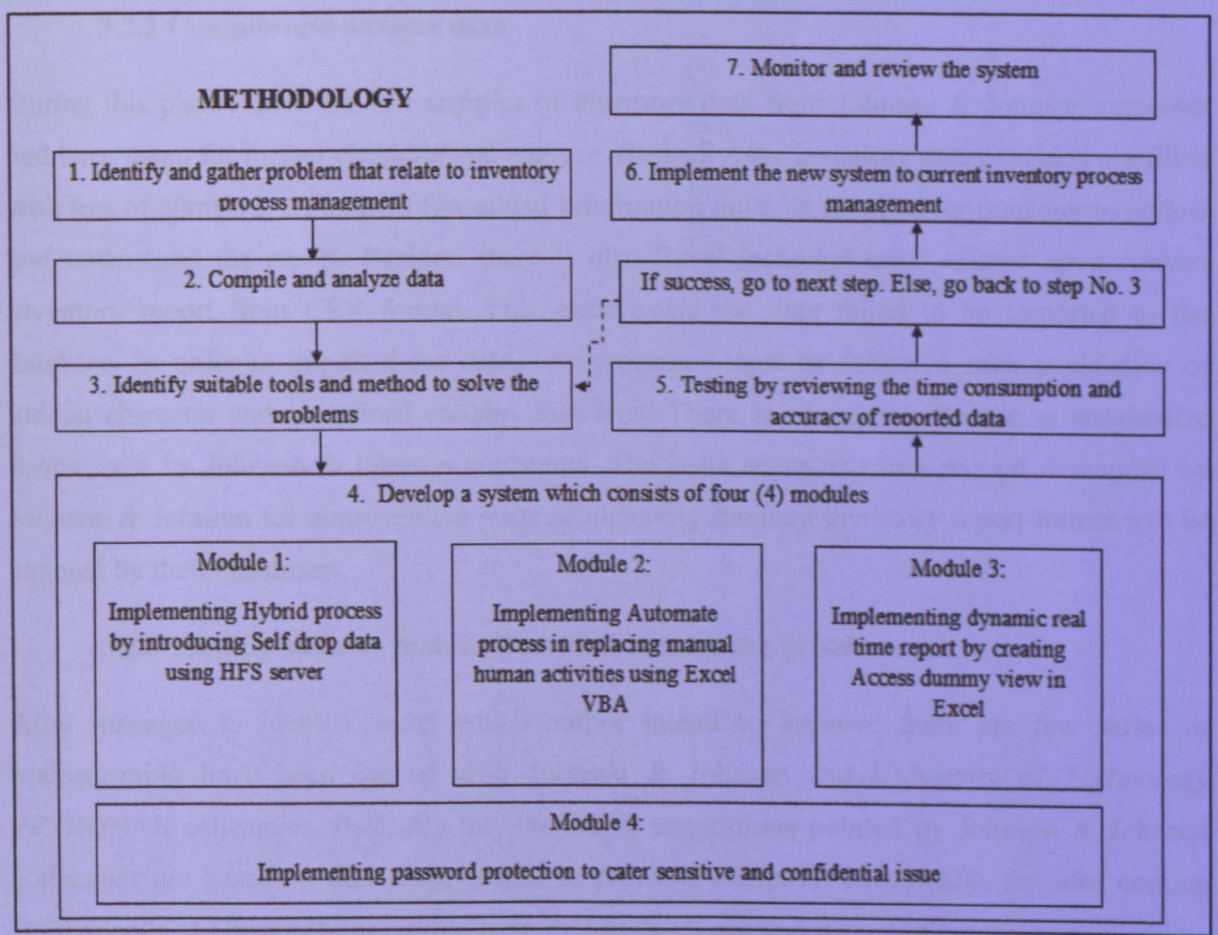

Figure 3.1: Iterative and Incremental development

3.2 Project Activities

3.2.1 Identify and gather problem that relate to inventory process management

In this phase, author get system analyst to explain the current Johnson & Johnson inventory management process. Besides, there would also explanations by system analyst in charge pertinent to the other companies' inventory management process such as DHL and CEVA logistic. These exposures give a better understanding to author in finding suitable area in term to improve the current Johnson & Johnson inventory management process. There is also several area highlighted by the system analyst regarding improvement that can be done.

3.2.2 Compile and analyze data

During this phase, there are few samples of inventory data from Johnson & Johnson customer had been taken for further checking and analyze. Basically, the inventory data provided are filled with lots of numbers. As a result few added information must be supplied for manager to review and understand the report. Besides, there is also Excel technical error existed upon convert inventory report from CSV format. This error cause the data failed to be imported to the database. In order to import those data, few processes must be followed such as deletion of hidden character and re-defined column data type. There is also data with not in standardize format sent by Johnson & Johnson customers. The issue arises as every request demanded by Johnson & Johnson for improvement purpose including standard inventory report format will be charged by their customers.

3.2.3 Identify suitable tools and method to solve the problems

After managed to identify areas which author intend to improve there are few series of brainstorming have been carried with Johnson & Johnson and University of Technology PETRONAS colleagues. Basically the alternative suggestions pointed by Johnson & Johnson colleagues are based on their experienced in previous company. Meanwhile, the idea coming from friends at University of Technology PETRONAS are based on contemporary application. The concept of self-drop data itself is using common application in today's world which is "DropBox". The concept has been taken to address differences of inventory data sending to Johnson & Johnson. On top of that, several reading on journals and internet searching have been

done to manage listed problems. Tools selection is based on tools flexibility and cost affordable. Furthermore, the availability of guideline and forum over the internet has been strong basis for tools to be selected.

3.2.4 Develop a system which consists of four (4) modules

Module 1:

In order to manage the differences in inventory report send over, author implement a HFS server inventory data gathering which is by synchronizing the ways of report sent to J&J. This module is using the concept of self-drop data. This idea required traditional and modern company to select related inventory data and added them to provided platform. This module is using HFS server as its platform. This process is almost similar to drag and drop files used in Microsoft Windows.

Module 2:

This module automates manual human activities using Microsoft Office Excel 2007 Visual Basic Advance. Even though there is no formal learning in using Excel Developer, author managed to find few forums that are really helpful for beginner users. Automation program will cover activities including cleaning Excel technical error, standardize inventory data format and re-defined column type. The process of pump in clean data to the database would also executed using automated program. Therefore, system analyst can avoid importing abundant data one by one.

Module 3:

This module also gives flexibility for manager to view the report. In general, manager can view dynamic report as chart provided and data appearance can been simply manipulated. The dynamic view is using Excel as its platform. The rationale of providing dynamic report is for manager to have quick reference. This is because, dynamic report will allow manager to define the way which they want to view the data.

Module 4:

The last module is to serve sensitive and confidential data. This module will implement password protection in three (3) areas. The first area is for Johnson & Johnson customer to drop the data at HFS server. The password protection will be applied using option provided by HFS server. The next area to be implemented is at automated program module. The password protection will be developed using GUI Developer provided in Microsoft Office Excel 2007. This password protection will avoid unethical user from using the program freely. The last area which password protection will cover is at inventory report part. This protection purpose is to avoid the inventory report from be viewed by unauthorized party. This password protection will also develop using GUI Developer inside Microsoft Office Excel 2007.

3.2.5 Testing by reviewing the time consumption and accuracy of reported data

This is very crucial phase as it will indicate the degree of success achieved. The testing part will be involved two (2) main indicators which are the level of easiness data consolidation up till pump the data into database and the accuracy of reported figure. The testing will be using result yield by Johnson & Johnson current inventory management process as fixed variable. The result will be compared accordingly based on indicator set up. The degree of success will be achieved if the new system can reduce the difficulty experienced by the current process and also the figure reported is accurate plus capability to do certain manipulation for viewing the data.

3.2.6 Implement the new system to current inventory process management

This phase involve the replacement of current inventory management process for interested manufacturing company with the new Inventory management system. The replacement will include training provided by author in term to explained the standard of procedure (SOP) using this system. Besides, the training will also cover on how significant of this system towards the effectiveness of inventory management.

3.2.7 Monitor and review the system

In this phase, a continuously monitor is very crucial. This is because the technical error address by the system is based on regular error reported. The appearance of new technical error will affect the figure reported. Therefore, it is a must to have inventory figure recorded by system analyst. The purpose of recording is to get the average figure supposed to have each month end. The appearance of extra ordinary result must be followed by future system improvement.

3.3 Tools

The tools needed in this project are:

- ✓ Microsoft Windows 32-bit Operating System XP or later
- ✓ Microsoft Office Excel 2007
- ✓ Microsoft Office Access 2007
- ✓ HFS Server
- ✓ Workstation with 2GB RAM

These are among tools required to fulfill the objective of this project. There a lot of alternative tools can be used to replace listed tools. Indeed, the listed tools were selected based on availability of forum for discussion and cost rate at minimum. The security of network using open source software such as HFS Server is ignored in this project due to time and financial constraint.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 HFS Server functionality

HFS server need to be installed and set up in order to achieve first module. This setup only includes manufacturing company party. HFS interface can be viewed from two (2) perspectives. The first perspective is from system analyst view as shown in figure 4.1 meanwhile the second perspective is from customer view as shown in figure 4.2.

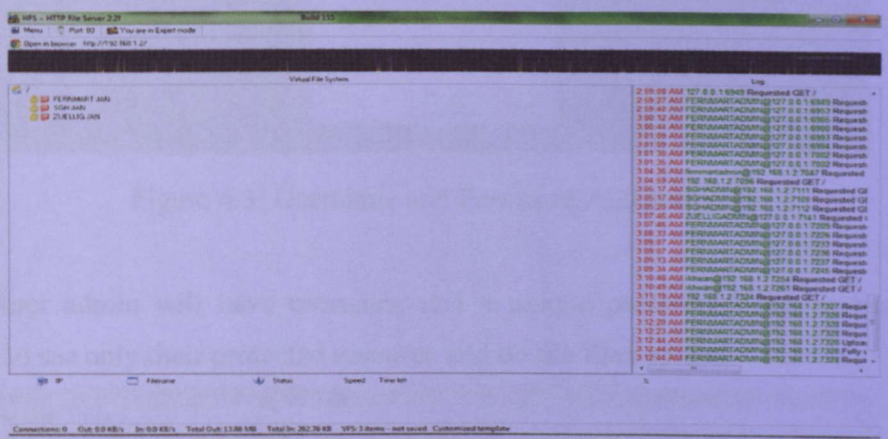

Figure 4.1: HFS Interface from System Analyst View

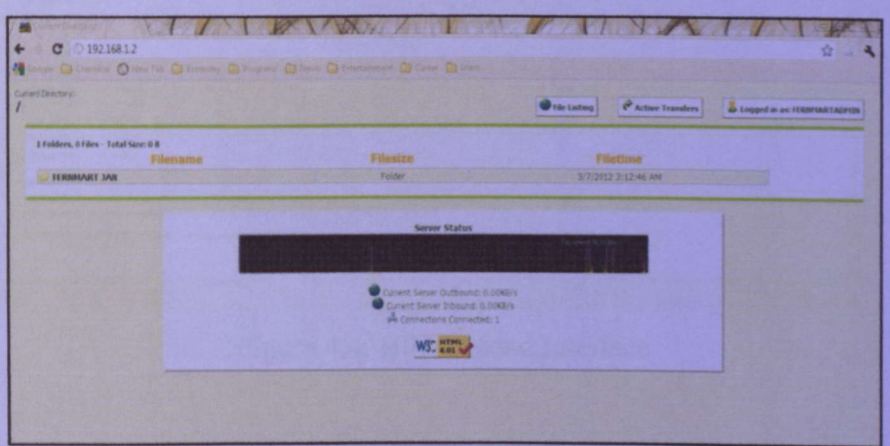

Figure 4.2: HFS Interface from Customer View

In order for customer to view the system, they will be prompt to enter their assigned username and password. The user account will be managed by system analyst. However, there is no

password allocated for system analyst to access the server as the server is using the approach of computer's unique IP address recognition. Figure 4.3 showed the interface of user authentication prior entering the HFS server.

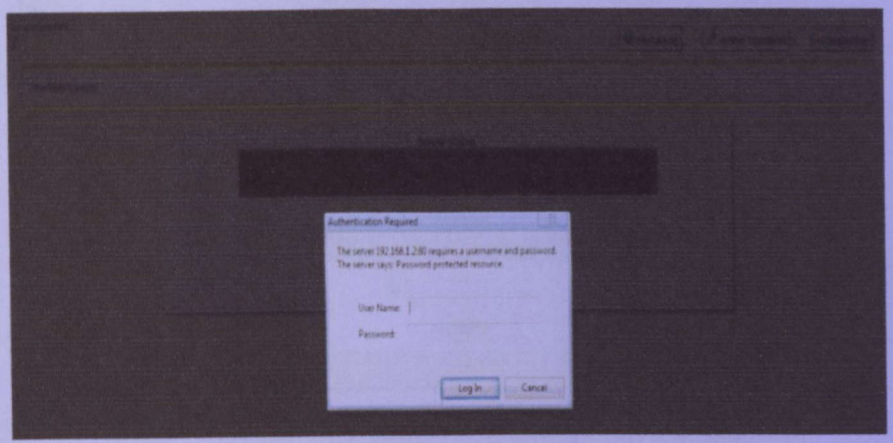

Figure 4.3: Username and Password Authentication

Every customer admin will have username and a unique password. This authentication will enable them to see only their protected resource and do the files upload.

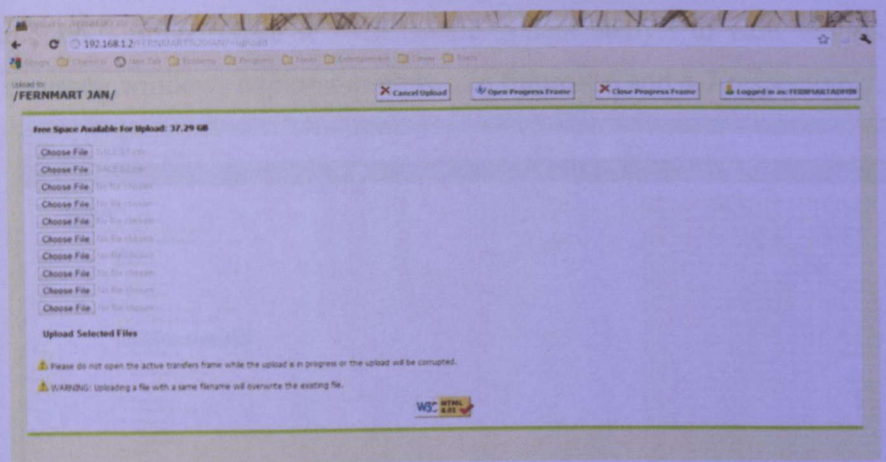

Figure 4.4: HFS Upload Interface

Figure 4.4 showed the upload part of HFS server. Successful uploaded files will be reflected in the list of protected resource available. Corrupted files might happen in case the uploaded files were opened during the midst of the process. HFS server works in a real time basis. Therefore every update happened; it will give direct affect to the list of files reside in the server. In this case

when system analyst opened the folder allocated for each customer, they can find the newly uploaded files upon it successfully updated as shown in figure 4.5.

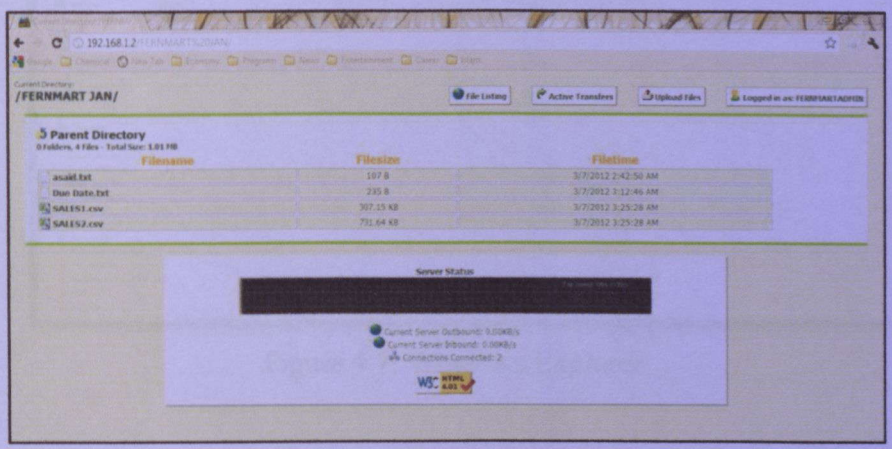

Figure 4.5: List of Update Available Protected Resource

Traditionally, system analyst will download sales and inventory data from email Microsoft Outlook. It far from efficient as the process will require system analyst to download each files instead of doing multiple download. In HFS, the option "Open It" enable system analyst to do multiple extraction. Option "Open It" will enable system analyst to view reports uploaded by customer in common windows explorer as shown in figure 4.6 and 4.7 respectively.

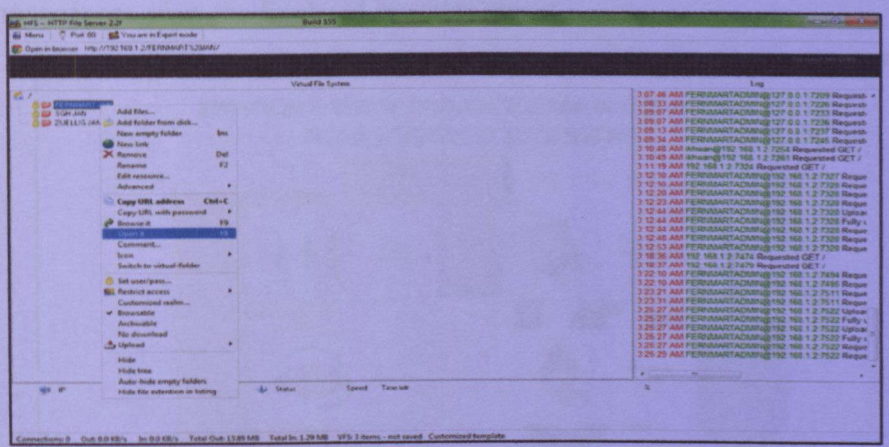

Figure 4.6: Option "Open it" Ease the Process of Files Download

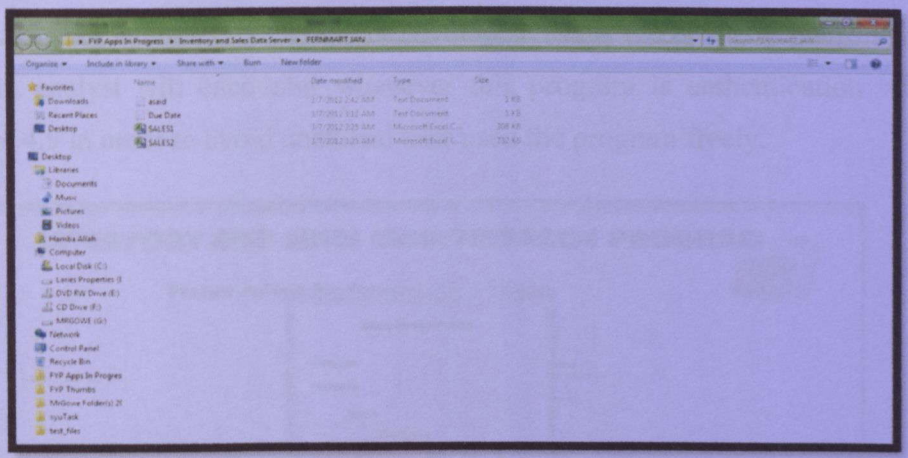

Figure 4.7: Windows Explorer

4.2 Visual Basic Advance Automate program

Upon extract data accordingly, system analyse need to execute Main Program Interface as shown in figure 4.8 . This interface provide integration of modules created in this project. The first button will bring system analyst to HFS server. The second button which is Inventory Maintenance Program will execute Visual Basic Advance automation program which is used for report cleaning. The button "Email Us" provided for system analyst to contact system developer in case they experienced non ordinary issues or ask for help. The last button which is Inventory report is for manager to view the finalized inventry report

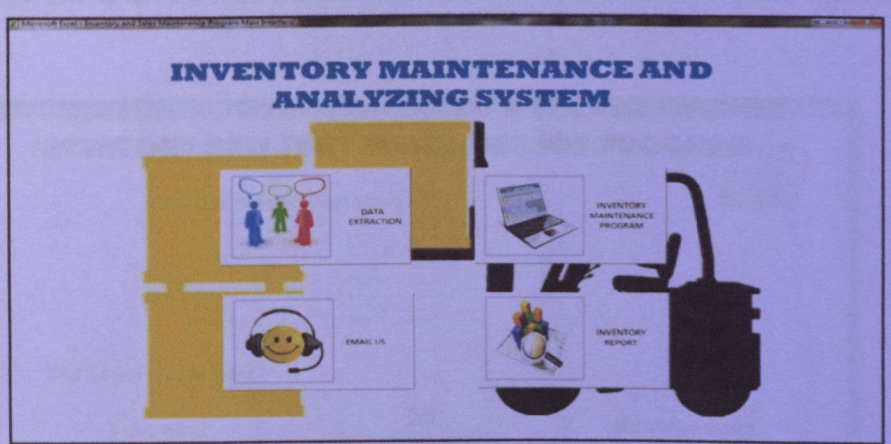

Figure 4.8: Main Program interface

Visual Basic Advance automate program is developed using Excel VBA platform. The first window system analyst will encounter whenever this program is authentication windows as shown in figure 4.9 in order to avoid unethical user used the program freely.

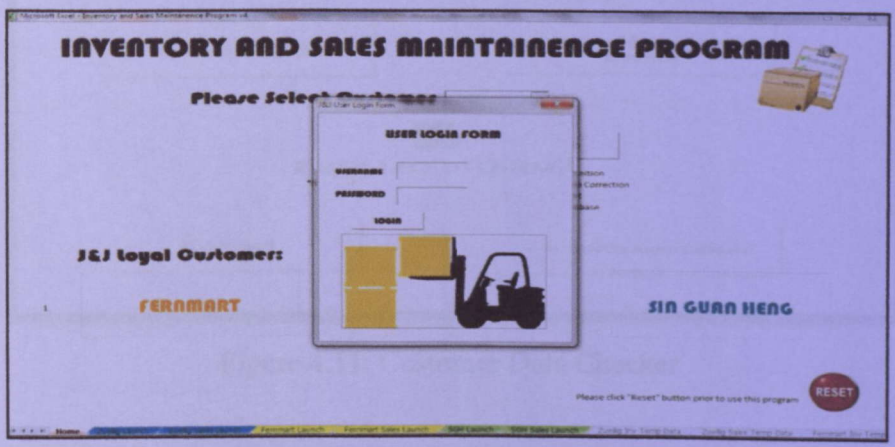

Figure 4.9: Excel Authentication Windows

The next windows system analyst would see is the Inventory and Sales Maintainance Program as shown in figure 4.10. Here, they need to choose the customer using the drop down button provided. After that, they must click on the button "Inventory Data" and "Sales Data" to proceed with the next process. Each button will bring them to a new windows which showed the step in fixing error.There are several button must be executed by system analyst prior exporting data to the database.

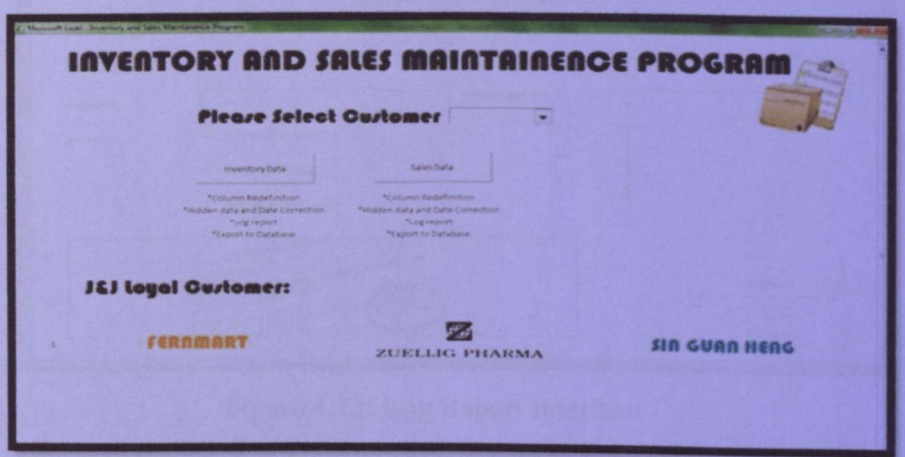

Figure 4.10: Inventory and Sales Maintainance Program

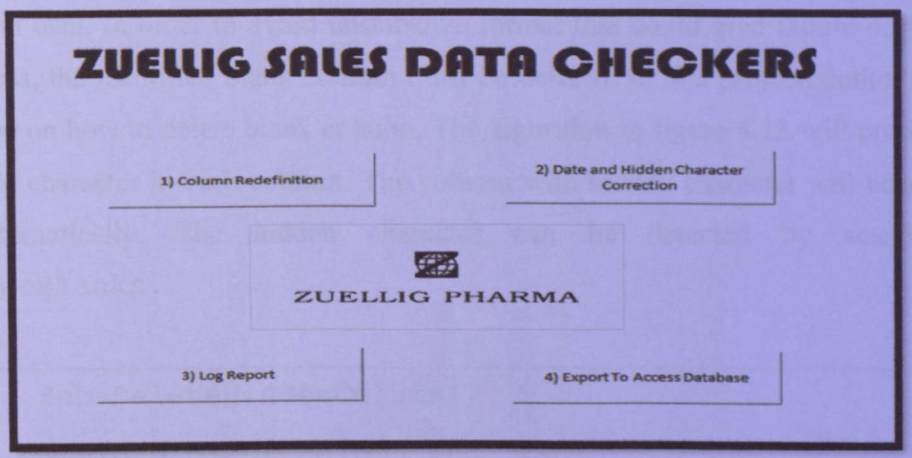

Figure 4.11: Customer Data Checker

The figure 4.11 is used to clean error in report sent by J&J customers. The first button which is column redefinition button will redefine format/type for each column. The second button is for date and hidden character fixing. If the data successfully been cleaned, system analyst can proceed to export the report to Access databe by clicking button "Export To Access Database". System Analyst can also log report as shown in figure 4.12 in case debug notification appear due to new problem detected in report sent by customers. They can log the report by clicking on the button "Log Report" and filled in the field provided accordingly.

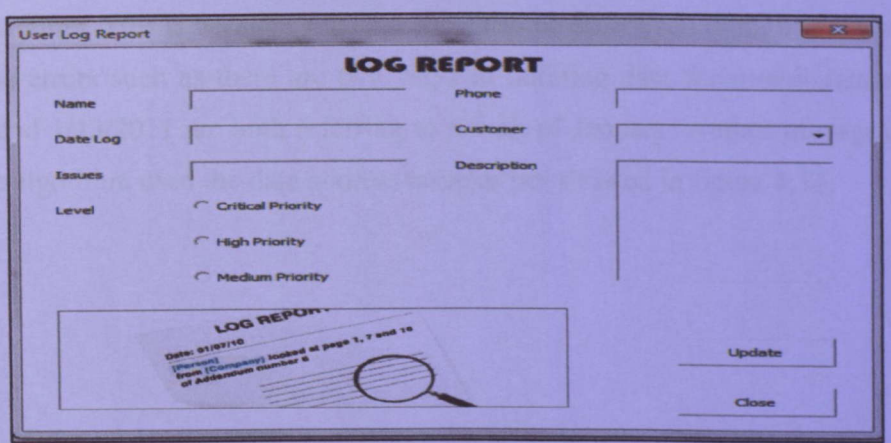

Figure 4.12: Log Report Interface

Hidden character suspected to happen whenever customer choose to click on the delete button for the key in data. In order to avoid unstabalize format that could give failure during the data export process, the identified blank column must be deleted. In this project, author managed to record Macro on how to delete blank column. The algorithm in figure 4.13 will prompt Excel to detect hidden character in each column. The column with hidden character will be selected and deleted automatically. The hidden character can be detected by searching using `xlcellTypeBlanks`.

```
Sub DeleteHiddenColumn()
'Delete blank column and row
Selection.SpecialCells(xlCellTypeBlanks).Select
Selection.delete Shift:=xlToLeft
End Sub
```

Figure 4.13: Algorithm used to delete hidden column

Pertinent to the issue of unstabalize format during report conversion author manage to write several lines of algorithm to solve the problem. The main issue for format redefinition comes from date's column. This is because, the date appear to be error even though standard format had been set. The errors such as there are two ways in defining date for month January. Example 12/01/2011 and 1/13/2011 are both referring to month of January. Author manages to solve the issue and the algorithm used the date address issue as per showed in figure 4.14.

```
Sub ZueSalDtHd()
    Sheets("Zuellig Sales Temp Data").Select
    Columns("C:C").Select
    Selection.NumberFormat = "m/d/yyyy"
    Columns("W:W").Select
    Range(Selection, Selection.End(xlToRight)).Select
    Selection.Delete Shift:=xlToLeft
    Sheets("Zuellig Sales Launch").Select
    If (Cells(1, 1).Value = 1) Then
    Sheets("Zuellig Sales Temp Data").Select
    Columns("D:D").Select
    Selection.Insert
    Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Columns("C:C").Select
    Selection.Replace What:="/", Replacement:=".", LookAt:=xlPart
    _SearchOrder:=xlByRows, MatchCase:=False, SearchFormat:=False,
    _ReplaceFormat:=False
    Range("D1").Select
    ActiveCell.FormulaR1C1 = "=VLOOKUP(C[-1],'VBA
    Data'!C[2]:C[3],2,0)"
    Range("C2").Select
    Range(Selection, Selection.End(xlDown)).Select
    Selection.Copy
    Range("D2").Select
    Selection.PasteSpecial Paste:=xlPasteValues, Operation:=xlNone,
    SkipBlanks _:=False, Transpose:=False
    Range("D1").Select
    Application.CutCopyMode = False
    Selection.Copy
    Range("D2").Select
    Range(Selection, Selection.End(xlDown)).Select
    ActiveSheet.Paste
    Columns("D:D").Select
    Application.CutCopyMode = False
    Selection.Copy
    ActiveSheet.Paste
    Columns("C:C").Select
    Application.CutCopyMode = False
    Columns("D:D").Select
    Application.CutCopyMode = False
    Selection.Copy
    Selection.PasteSpecial Paste:=xlPasteValues,
    Operation:=xlNone, SkipBlanks _
    :=False, Transpose:=False
    Columns("C:C").Select
    Application.CutCopyMode = False
    Selection.Delete Shift:=xlToLeft
    End If
    Sheets("Zuellig Sales Launch").Select
End Sub
```

Figure 4.14: Algorithm used to solve date's issues

This algorithm are been used togather with set of lookup data. The error will be identify and lookup with correct cases. Methods of vlookup presense upon the process of format alteration which includes changes of slash to dots and column redefinition.

4.3 Real Time inventory report

The real time report can be obtain by having stored data inside the database. In order to avoid error in stored data, the best way is to have dummy view of Microsoft Office Access 2007 in Microsoft Office Excel 2007 as shown in figure 4.15. The advantage of having Access dummy view of in Excel is that, all changes happened at Excel will not give any impact to the data inside Access database.Aside of mirorring data inside database, the option pivort and chart table provide the manager with flexiblity to analyze data. Thera is also auto data analyze by using pre-defined formula to ease managerial decision making as shown in figure 4.16.

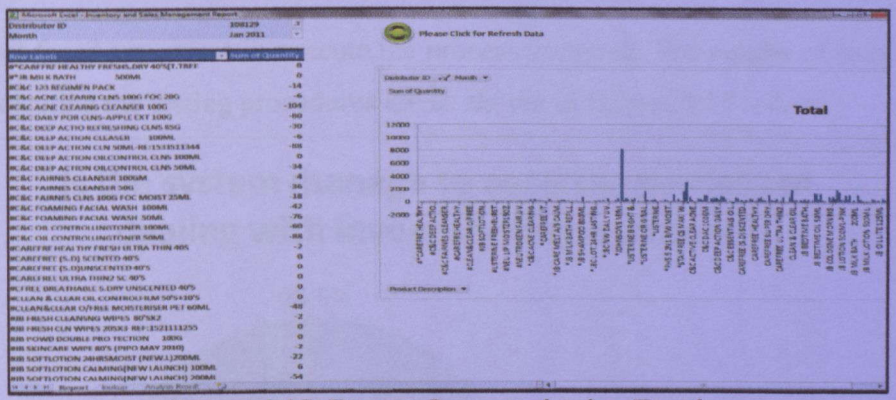

Figure 4.15: Report Generated using Excel

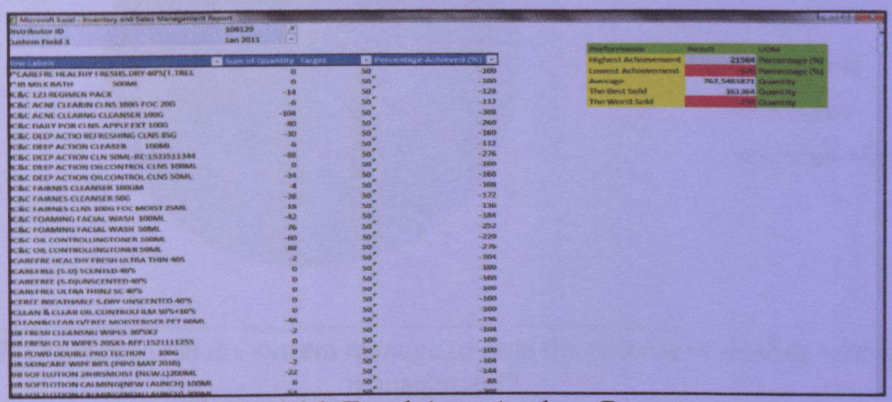

Figure 4.16: Excel Auto Analyze Report

4.4 Testing

The testing part is involving two (2) main indicators which are the level of easiness from report gathering up till pump the data into the database and the accuracy of reported figure. The testing involved 10 students with various academic backgrounds. Prior to the testing part, the student been briefed the significance of this project to solve current issues faced by system analyst. The old and new processes were shown to increase the tester understanding. The tester required to consolidate report from Gmail and fix the report as per inform earlier. Indeed, the first timer user facing difficulties to remember the step required in cleaning the data. Besides, based on tester feedback, among the issues with current processes is that the application used to do the tasks are scattered around and need to be browsed in order to complete the tasks. However, the newly introduce system give a greater ease to tester. The tester do not find lot of difficulties upon been briefed what to do as the tester only required to click the button provided. During the testing, all

modules do not faced any errors in execute the process assigned. The results of surveys from the tester upon executing the testing procedures are as shown in figures 4.17 – 4.19.

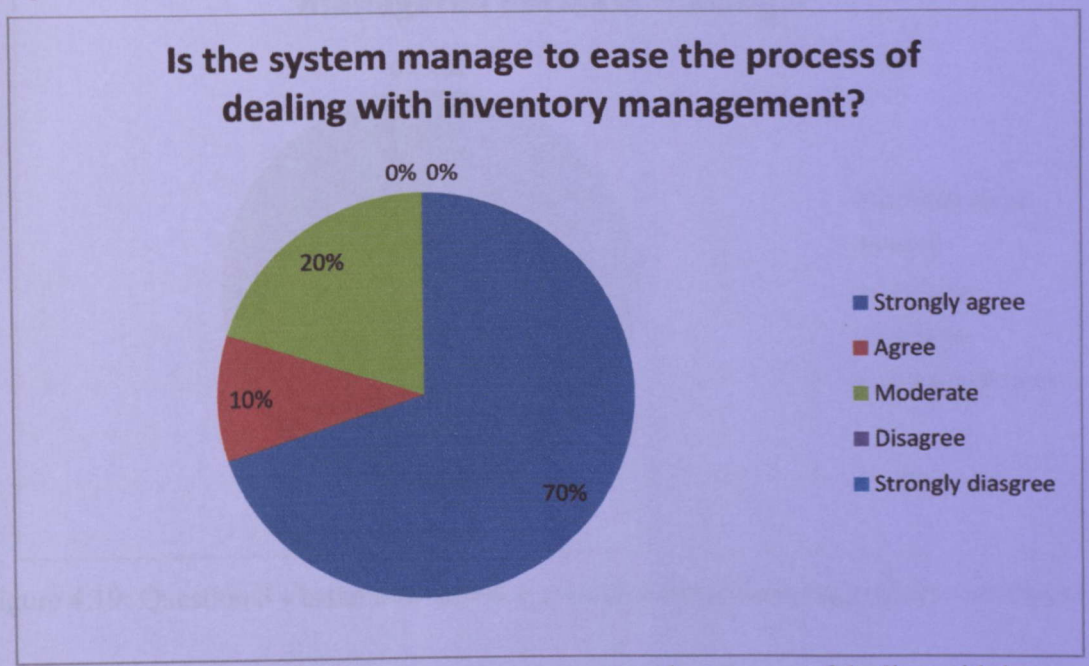

Figure 4.17: Question 1- Is the system manage to ease the process of dealing with inventory management?

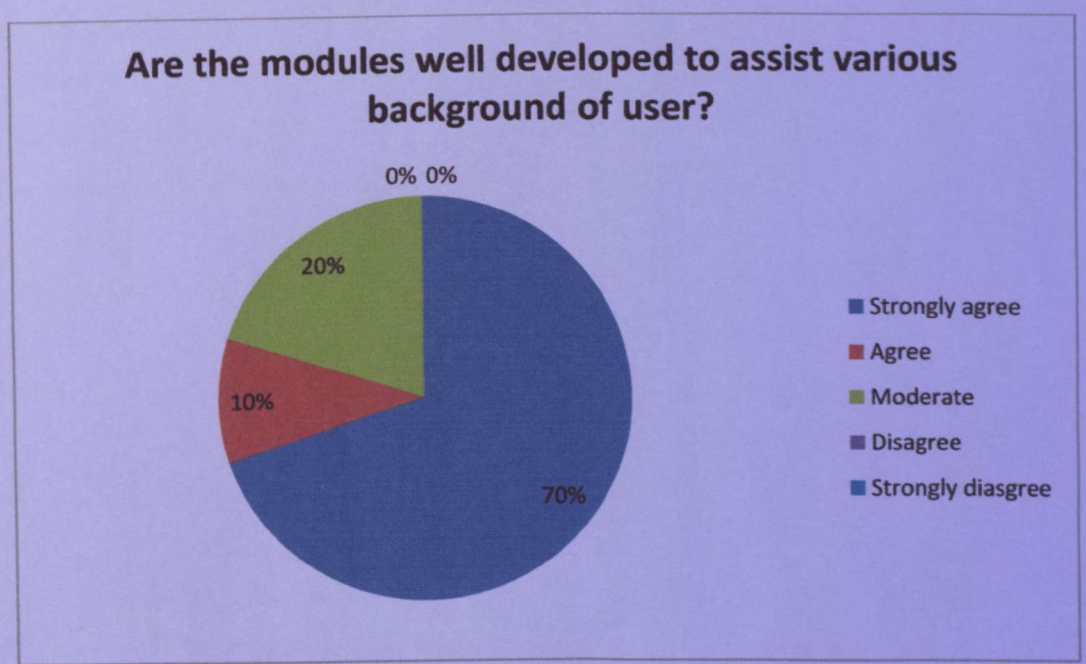

Figure 4.18: Question 2 - Are the modules well developed to assist various background of user?

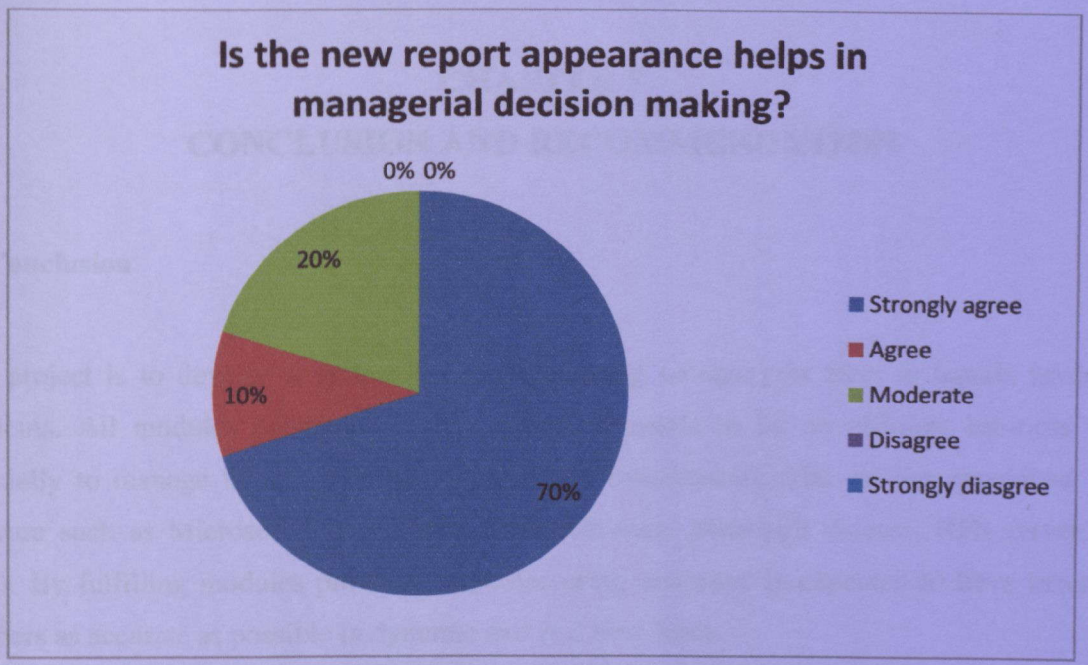

Figure 4.19: Question 3 - Is the new report appearance helps in managerial decision making?

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This project is to develop a system for manufacturing company in term to handle inventory problems. All modules contained in this system integrate to be an efficient business tools especially to manage human intervention and data inaccuracies. The system developed from software such as Microsoft Excel Visual basic Advance, Microsoft Access, HFS server, and CMD. By fulfilling modules provided, manufacturing company is expected to have inventory numbers as accurate as possible in dynamic and real time basis.

Based on the testing result, this project managed to reduce time consumption in report generated and behave in user friendly environment. Tester managed to learn quickly the new system in a short period of time. Besides, there is no direct human intervention with the data with these newly introduce modules. The levels of data integrity explicitly increased and lead the correct managerial decision making.

Indeed, the current research aims to reduce human intervention and time consumption managed to be proved. The achievable of listed objective had brought this project to a new milestone in term of addressing current inventory management problems.

5.2 Recommendation

Even though this project is an effort to cover most of inventory problems, the level of security are not be emphasized as major concern due to time and financial constraint. That is why, this project addressing to solve day to day inventory issue rather than giving a big emphasize on how weak security issue can give harm to the inventory data.

If future study, this project can be focusing in avoiding open source software as the tools needed. This is because most of big company will tend to reject the system using open sources

software. This is due to copyright issue as open source software does not have any particular developer to refer.

Besides, it is good to initiate web based platform for Visual Basic Advance Automate program. Indeed, to have a web based as main platform will enable system analyst to work from everywhere they want with the conditional of internet presence. As a result, the time taken for generating report will be much faster.

APPENDICES

1) Gantt Chart and Milestone

APPENDIX 1-1

Final Year Project 1: September 2011

ID	Task name	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W 10	W 11	W 12	W 13	W 14
1	FINAL YEAR PROJECT 1														
2	Selection of Project Topic														
3	Preliminary Research Work														
4	Problem Identifying and literature review														
5	Submission of Extended Proposal														
6	Project Research and pre-development														
7	Project analysis and synthesis														
8	Proposal Defense														
9	Project Works Continues														
10	Submission of Interim Draft report														
11	Submission of Interim Report														

Week	W
FYP 1 Progress	
Tasks Progress	
Milestone/Dateline	

APPENDIX 1-2

Final Year Project 2: January 2012

ID	Task name	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W 10	W 11	W 12	W 13	W 14	W 15
1	FINAL YEAR PROJECT 2															
2	Project Development															
3	Submission of Progress Report															
4	Project Development Continues															
5	Pre- EDX															
6	Submission of Draft report															
7	Submission od Dissertation (Soft Bound)															
8	Submission of Technical Paper															
9	Oral Presentation															
10	Submission od Dissertation (Hard Bound)															

Week	W
FYP 1 Progress	
Tasks Progress	
Milestone/Dateline	

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