



**Faculty of Mechanical and Manufacturing
Engineering Technology**

**DEVELOPMENT OF A NEW SPREAD SHEET SYSTEM FOR
INVENTORY MANAGEMENT**

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**Bachelor of Manufacturing Engineering Technology (Process and Technology) with
Honours**

2018

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**This report is submitted in accordance with the requirement of the Universiti
Teknikal Malaysia Melaka (UTeM) for Bachelor of Manufacturing
Engineering Technology (Process & Technology) With Honours**

**Faculty of Mechanical and Manufacturing
Engineering Technology**

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2018

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: DEVELOPMENT OF A NEW SPREAD SHEET SYSTEM FOR INVENTORY MANAGEMENT

SESI PENGAJIAN: 2018/2019 Semester 1

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This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor's Degree in Manufacturing Engineering Technology (Process and Technology) with Honours. The member of the supervisory is as follow:

.....

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DEDICATION

Thank you to everyone who involved in this project, directly or indirectly.

This is for you, Zuraida Binti Zainal, Zainal bin Abdullah, Aminah Binti Amin Nordin, and
the whole Hj Zainal Family.

Thank you Geng Bunga Raya Puaka, Geng Saga Putih and FETSA Family 15/16 & 16/17.

I can't complete this without you guys!!

ABSTRACT

In recent times, inventory control is a very vital role towards an organization because each and every one of the supply must be controlled, managed, and can be tracked at anytime and anyplace. At the present time, inventory control is more critical towards sustainability as well as successfulness of the organization. This project discussed about current inventory control management in *Petite Planner* store and developed a mobile phone application according to the process mapping followed by the testing the capability of the mobile phone application called “Store Management system” to manage the inventory at the store. The characteristics of Store Management are count, manage, document stock transaction and track the supply in store. The mobile phone application is run in Android system and the data will be stored at a cloud database called Firebase Real-time Database. Firebase Real-time Database is a database can reach information stored at anytime and anywhere that have internet access. Store Management contains two categories which is “Admin” as well as “Guest”. It also have authentication’s characteristic to recognize the user by using E-mail and password to log in into it. The system capability testing is been carried to experiment the Store Management and the outcomes and user comments were talked about in this project. Several end users have been selected, which is the store manager, the owner and previous clients to test the mobile phone application. The mobile phone application is acknowledged by the end users which the store manager and owner of *Petite Planner*. Inventory control by using mobile phone application has proven to provide more efficient inventory control compared to current inventory control system.

ABSTRAK

Pada masa ini, kawalan inventori memainkan peranan yang sangat penting terhadap sesuatu organisasi kerana setiap satu daripada bekalan mesti dikawal, diuruskan, dan boleh dikesan pada bila-bila dan di mana-mana sahaja. Kawalan inventori lebih kritikal pada masa kini terhadap kelestarian serta keberhasilan organisasi. Projek ini membincangkan pengurusan kawalan inventori semasa di stor *Petite Planner* dan membina aplikasi telefon mudah alih mengikut proses pemetaan diikuti dengan menguji keupayaan aplikasi telefon bimbit yang disebut "*Store Management*" untuk menguruskan inventori di stor. Ciri-ciri "*Store Management*" adalah mengira, menguruskan, mendokumenkan transaksi stok dan menjejak bekalan di stor. Aplikasi telefon bimbit digunakan dalam sistem *Android* dan data akan disimpan di pangkalan data awan yang dikenali sebagai *Firebase Real-time Database*. *Firebase Real-time Database* adalah pangkalan data yang boleh mengakses maklumat yang disimpan pada bila-bila masa dan di mana sahaja yang mempunyai akses internet. "*Store Management*" mengandungi dua kategori iaitu "Admin" dan juga "Peguna". Ia juga mempunyai ciri pengesahan untuk mengenali pengguna dengan menggunakan E-mel dan kata laluan untuk log masuk ke dalamnya. Ujian keupayaan sistem telah dijalankan untuk mencuba "*Store Management*". Hasil ujian dan ulasan pengguna dibincangkan dalam projek ini. Beberapa pengguna akhir telah dipilih, iaitu pengurus stor, pemilik dan pelanggan terdahulu untuk menguji aplikasi telefon bimbit. Aplikasi telefon bimbit diakui oleh pengguna akhir yang mana pengurus toko dan pemilik *Petite Planner*. Kawalan inventori dengan menggunakan aplikasi telefon mudah alih telah terbukti untuk menyediakan kawalan inventori yang lebih cekap berbanding sistem kawalan inventori semasa.

ACKNOWLEDGEMENT

First and foremost, I would like to take this opportunity to express my sincere acknowledgement to my supervisor Associate Professor Dr. Wan Hasrulnizam Bin Wan Mahmood from Faculty of Mechanical and Manufacturing Engineering Technology, Universiti Teknikal Malaysia Melaka (UTeM) for his essential supervision, encouragement and support towards the completion of this project.

A great thanks to all especially my mother, Zuraida binti Zainal, Hj Zainal family members and friends for their moral support in completing this project from the start till the end. Lastly, thank you to everyone who had been involved directly or indirectly towards the completion of this project.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

ANSI	American National Standards Institute
BOM	Bill of Material
ERP	Enterprise Resource Planning
IBM	International Business Machines
IDE	Integrated Development Environment
IEC	International Electro technical Commission
iOS	iPhone Operating System
IRI	Inventory Record Inaccuracy
ISO	International Organization for Standardization
Java ME	Java Micro Edition
mm	Millimeter
OS	Operating System
PA system	Public Address System
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association
PDA	Personal Digital Assistant
PIC	Person-In-Charge
QR Code	Quick Response Code
ROM-DOS	Read Only Memory - Disk Operating System
SDLC	System Development Life Cycle
UIQ	User Interface Quartz
UPC	Universal Product Code

CHAPTER 1

INTRODUCTION

1.0 Project Background

Inventory management is a crucial aspect to a company or an organization that involve with stock, either raw material inventory, finished goods inventory, work-in-progress inventory or other type of inventory. Hagan & Wylie (2006) stated that inventory management is the action which arranges the accessibility of stocks to the clients, starting from manufacturing process of the stocks until the purchasing done by the clients. This task includes the supply of present sales items, new goods, consumables goods, spare parts, out of date items and all other supplies. This means that inventory management is an extra critical aspect towards the successfulness and sustainability of the company to achieve good results towards the end of a business year.

It is important for a company to have accurate inventory management. An imprecise inventory management can show the way to the company towards losing business profits at the end of the business year. As an example, a client came to a steel factory to buy 10 bars of mild steel with the dimension 100mm x 100mm x 50m. When check with the store, store manager stated that only 7 units of the mild steel bars are in stock. If the client still wants 10 bars of the mild steel, clients will have to wait due to the factory need to produce additional 3 mild steel bars to meet the client demand. Finally the client decides to go to other company to find the desired product. When weekly store check is done at the end of the week, store manager found out that there are additional 5 mild steel bars with dimension 100mm x 100mm x 50m that are placed in other area of the store. This has

led the company to have a loss in their business due to imprecise inventory management. Based on Chuang & Oliva (2015), the estimated IRI (Inventory Record Inaccuracy) for a retail store is 29%, so the retail store loses 10% profit. Hard to check the amount of the stock in a little time is one of the several factors affect the IRI of the retail store.

Referring to Wang, Fang, Chen, & Li (2016) in the article of “*Impact of inventory inaccuracies on products with inventory-dependent demand*” stated that there are three main factors that causes inventory record inaccuracy, which is stock misplacement, stock is missing and stock transaction errors. Stock misplacement maybe is due to new to staff or changing of storage place. Missing stock is occurring due to theft issue done by shoppers, vendors or the employees of the company or store. Stock transaction errors occur due to system malfunctioning or other factors.

In the new global economy, inventory control has become a central issue for the need of a computerized system designed for an improved documentation for the supply records then prevent any aging records decline occur. By hand tracking and checking inventory in this era is nearly impractical by today’s industry benchmark. This is where inventory management by system plays a big role in managing inventory and towards a company sustainability and success. A research done by Brief & Seventeen (2017), percentage of smartphone users keep on rising from 68.7% in 2016 to 75.9% in 2017 and the percentage of Internet users in 2016 was 76.9% which increase from 68.4% in 2015. This data shows that a modern inventory management system is suitable in this modern era.

1.1 Problem Statement

Event Management is a wide area of business that includes birthday party, farewell ceremony, seminars, conferences, marriage and many more. Marriage has become compulsory to all human beings on this earth, regardless of religion or race. In Islam, marriage is one of the compulsory things if one has been able to be to commit in external and inner feelings. Usually in Malay culture, wedding ceremony will be divided in three main events, which is solemnization ceremony, match event at the bride side and welcoming the bride on the groom side.

For each of this event, usually the wedding planning services are required to ensure the event run smoothly as possible. Wedding planner package usually includes the setup of the bridal dais, PA system, lighting systems and catering service. For the setup of the bridal dais, the items such as backdrops, artificial flower, stage and platforms, chandeliers and others are kept in a store. If the wedding planner does not have the item that are requested by their client, wedding planner will have to rent the desired item from other wedding planner or a shop that rent wedding items. One of the famous wedding item renting shops is called *Something Borrowed by Nawal*, which is located at Cyberjaya, Selangor. *Petite Planner* is one of the wedding planner companies that are based in Kuala Lumpur, Malaysia. It is founded in 2008 by Nadia Zainal, who previously owns a flower shop located in a shopping complex in Kuala Lumpur, Malaysia. Nowadays, *Petite Planner* is run by Liyana Hamzah, the daughter of Nadia Zainal.

In this current time, for *Petite Planner* owns a store that is located at Kepong, Kuala Lumpur to keep their entire bridal dais setup items. There is no specific inventory management system up until this point and currently, the PIC (person-in-charge) for the store lives in Melaka, Malaysia. So it is hard for the PIC to know what items has gone out and what new item has been bought by *Petite Planner* because there is no logbook or form

to be filled by the person who took out or buy new item for the company. So the PIC has to check every single item each time he goes to Kuala Lumpur in each month. This will lead to waste in time and waste in over processing for the PIC to count and update the items in the store each month and the result for this activity is not efficient. The PIC also need plenty time to get the real time accurate data in the store because the stock in and stock out is too many.

Existing research recognizes the critical role played by inventory management towards the successfulness of a company or business. Recent evidence by Ye (2014) suggests that inventory management show an vital part when retailers is deciding or on the other hand adjusting their manufactured goods mixes. Besides that, the cost parameters and lead time of alternate sources show extra vital aspect than the other types of time parameters stated by Li, He, & Chen (2017) in their article. Previous research done by Atieh et al. (2016) has established that Enterprise Resource Planning, which is frequently described as an ERP system, which integrates each and every one of the units inside an organization at the data level, acts as an vital role for a successful company or business. All of this previous research reinforces the reason for the development of an inventory management system for *Petite Planner* store to ensure the company attains a successful business. The figure below shows the demand for *Petite Planner* for the year of 2017.

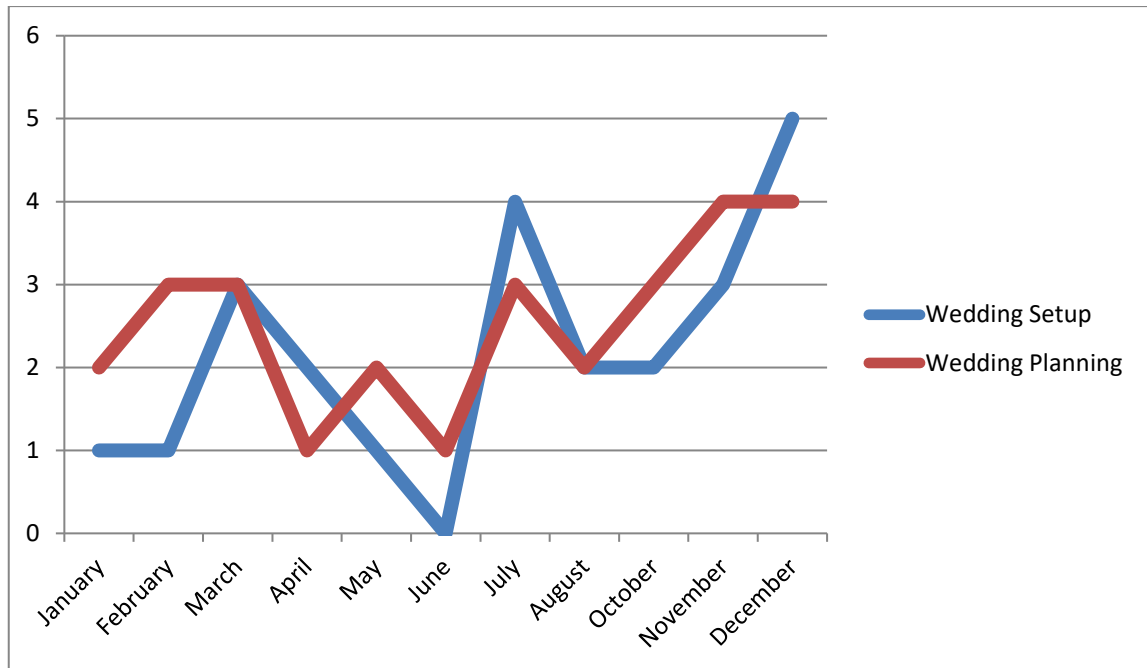


Figure 1.1: Demand of *Petite Planner* (Liyana Hamzah, 2018)

1.2 Research Questions

Several types of research question have been found on the importance of inventory management as one of the key factor towards a successful company or business. The type of research question used is 5W and 1H question which refers to What, Where, When, Why, Who and How.

1. What is the objective of inventory management?

Recent work by Grabner (2012) has established that the objective of inventory management is to accomplish suitable levels of client demand at the same time maintain the inventory expenses within acceptable bounds. This statement is supported by Stevenson (2016) who shared the same vision on the objective of inventory management.

2. Where does inventory management usually apply?

Inventory management is usually applied at warehouse or store according to Singh & Verma (2018), Feng, Fung, & Wu (2017), Bendig, Brettel, & Downar (2018) and other several sources. Bean, Joubert, & Luhandjula (2016) also stated that military department also applies inventory management.

3. When does inventory management usually important?

Inventory management is usually important towards an organization that requires a warehouse or store and plays a vital role in the existence of an organization as stated by Hagan & Wylie (2006) .

4. Why inventory management is important?

Mandall (2016) says that inventory management is important to give better service towards clients, increase the efficiency of the operation and minimize or eliminate the wastes.

5. Who needs inventory management?

Inventory management is needed by company or organization that deals with stock in and out and has a store or warehouse based on article wrote by Bendig et al. (2018).

6. How to use inventory management?

The most suitable method to use inventory management is through filling out forms or via spreadsheet software tool as stated by Klosterhalfen, Holzhauser, & Fleischmann (2018).

1.3 Objective

The supply accurateness is very important toward *Petite Planner* store. This is because the items should be controlled to make sure that the business runs smoothly at all times. The objective of this project is to develop the stock record using mobile phone application. This objective can be accomplished by following specific goals as listed below:

- To identify significant parameter for wedding planner inventory management.
- To develop wedding planner inventory management system using mobile phone application.
- To make best recommendation for development of wedding planner inventory management system.

1.4 Scope

This project applied the concept of inventory management system, mobile apps application, and statistical analysis. This project was carried out to develop a mobile phone application for the bridal dais items only specially for *Petite Planner* Store which is located at Kepong, Kuala Lumpur as a case study. This is for the formation of an inventory control application with mobile phones. The mobile phone application of this project called “Store Management”, which is specifically designed for Android operating system. The developer platform used to develop this application is Android Studio and this application requires the internet connection to run successfully. This is because the inventory records will be stored in a cloud database called Firebase real-time database. So the inventory records can be accessed at anytime and anywhere in this world as long as internet access is available. The Store Management can be logged in with numerous users at the identical time due to the system. All the users will have the access of the same cloud-database. The Store

Management needs to recognize the identity of a user before starting the mobile application since the cloud database is classified hence user authentication is required. The authentication requires the user's email and password. The mobile application will consist of two categories which is "Admin" and "User". The System Development Life Cycle (SDLC) is chosen as technique of mobile phone application design. SDLC comprises of project preparation, system study, design, testing and implementation. Be that as it may, this project tag along the SDLC until the testing stage only. This project does not involve in any cost analysis.

1.5 Significant of Project

The expected results for this project is produce a mobile application for inventory control call Store Management. This mobile application is intended to help for controlling and managing the inventory management for *Petite Planner* store specifically.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter stated the review of theory, technique, patents and any scholar articles or journals that are related to this project.

2.1 Inventory: An overview

Inventory is defined as the work-in-process products, raw materials or completed product that are considered to be the portion of a company's assets that are ready or will be ready for sale or rent. Inventory usually practiced in a warehouse where all of the items or raw materials are kept based on Vrat (2014). To maintain the achieved success for a company, a perfect inventory system needs to be applied to ensure great outcome and success to a company.

Inventory also can be defined as a physical supply reserved in the distribution centre to accomplish anticipated requirement. One more phrase to say inventory is an obtainable asset in any case idles having a net worth towards a company on the other hand organization. Based on Aydinliyim, Pangburn, & Rabinovich (2017), inventory is customarily seen as a way to offer instant item supply, but, progressively over time, it is moreover being viewed as an instrument to control product need from customer.