Institute of Technology Management and Entrepreneurship

THE INFLUENCE OF INVENTORY MANAGEMENT PRACTICE ON OPERATION EFFICIENCY: A CASE STUDY OF MUEHLBAUER AUTOMATION (MALAYSIA) SDN. BHD.

Sritharan A/L Sundra Sagar

Master of Engineering Business Management

2024

THE INFLUENCE OF INVENTORY MANAGEMENT PRACTICE ON OPERATION EFFICIENCY: A CASE STUDY OF MUEHLBAUER AUTOMATION (MALAYSIA) SDN. BHD. MELAKA

SRITHARAN A/L SUNDRA SAGAR

A Master project submitted in fulfilment of the requirements for the degree of Master of Engineering Business Management

Institute of Technology Management and Entrepreneurship

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2024

DECLARATION

I declared that this master project entitled "The Influence of Inventory Management Practice on Operation Efficiency: A Case Study of Muehlbauer Automation (Malaysia) Sdn. Bhd., Melaka" is the result of my own research except as cited in the references. The master project has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : .....

Name : Sritharan A/L Sundra Sagar

Date : 07/10/2024

APPROVAL

I hereby declare that I have read through this master project and in my opinion this master project is sufficient in terms of scope and quality as a partial fulfillment of Master of Engineering Business Management.

Signature :.....

Supervisor Name :Prof. Madya. Dr. Samer Ali Hussein Al-Shami

Date :07/10/2024.....

DEDICATION

To my beloved mother and father.

ABSTRACT

Studies have been conducted on the influence of inventory management practice on operation efficiency: a case study of Muehlbauer Automation (Malaysia) Sdn. Bhd., Melaka. Manufacturing company like Muehlbauer Automation are perceived to be failing due to ineffective management practices, using an interview survey, this study pursued to determine the inventory-management practices of Muehlbauer Automation operating in Ayer Keroh, Melaka, and to evaluate the effectiveness of the inventory-management practices currently used by these company. In addition, the study also to determine the challenges, if any, those are experienced by Muehlbauer Automation from the inventory- management practices currently used. This study was motivated by a lack of research on inventory-management practices Muehlbauer Automation. The findings of the study revealed that most of the Muehlbauer Automation used. Rule of Thumb‟ as an inventory-management practice. Regarding the effectiveness of the practices used, the study revealed that the Muehlbauer Automation investigated were perceived to be moderately effective, with Muehlbauer Automation practising good inventory management techniques such as Enterprise Resources Planning (ERP). Muehlbauer Automation faced a number of challenges from its current inventory-management practices. The findings from the respondents indicated that some of the main challenges included surplus, shortage of inventory, data entry errors, and slow moving parts that had been increasing due to incompetent staff; other challenges included physical inventory that did not match records; and an inability to meet customer demand.This study closes the knowledge gap in this underutilised field of research and adds to the body of literature on Muehlbauer Automation's inventory-management procedures.The results of this study will be helpful to Muehlbauer Automation's decision-makers as they will advance various inventory-management techniques and best practices that are necessary for firms to thrive.

PENGARUH AMALAN PENGURUSAN INVENTORI TERHADAP KECEKAPAN OPERASI: KAJIAN KES MUEHLBAUER AUTOMATION (MALAYSIA) SDN. BHD. MELAKA

ABSTRAK

Kajian telah dilakukan mengenai pengaruh amalan pengurusan inventori terhadap kecekapan operasi: kajian kes Muehlbauer Automation, Melaka. Syarikat perkilangan seperti Muehlbauer Automation dianggap gagal kerana amalan pengurusan yang tidak berkesan. Dengan menggunakan tinjauan temu bual, kajian ini dilakukan untuk menentukan amalan pengurusan inventori Muehlbauer Automation yang beroperasi di Ayer Keroh, Melaka, dan untuk menilai keberkesanan amalan pengurusan inventori yang kini digunakan oleh syarikat ini. Di samping itu, kajian ini juga untuk menentukan cabaran, jika ada, yang dialami oleh Muehlbauer Automation dari amalan pengurusan inventori yang sedang digunakan. Kajian ini didorong oleh kurangnya penelitian mengenai amalan pengurusan inventori Muehlbauer Automation. Hasil kajian menunjukkan bahawa kebanyakan Muehlbauer Automation menggunakan „Rule of Thumb" sebagai amalan pengurusan inventori. Mengenai keberkesanan amalan yang digunakan, kajian menunjukkan bahawa Muehlbauer Automation yang disiasat dianggap cukup berkesan, dengan Muehlbauer Automation mempraktikkan teknik pengurusan inventori yang baik seperti Just in Time (JIT), Enterprise Resources Planning (ERP), Kanban dan First in, First Out (FIFO). Berkaitan dengan cabaran yang dihadapi oleh Muehlbauer Automation dari amalan pengurusan inventori yang digunakan saat ini, hasil kajian menunjukkan bahawa kecurian, kekurangan inventori, kesalahan disebabkan oleh kakitangan yang tidak cekap, inventori fizikal tidak sesuai dengan rekod dan ketidakupayaan untuk memenuhi permintaan pelanggan adalah beberapa cabaran utama yang dihadapi. Kajian ini menyumbang kepada literatur mengenai amalan pengurusan inventori Muehlbauer Automation dan mengisi jurang pengetahuan dalam bidang penyelidikan yang diabaikan ini. Penemuan kajian ini penting bagi pembuat keputusan Muehlbauer Automation kerana mereka akan diberi penerangan mengenai amalan terbaik dan amalan pengurusan inventori yang berbeza yang penting untuk kelangsungan perniagaan mereka dan yang telah diterima pakai oleh pesaing mereka. Ini harus membolehkan mereka menilai amalan pengurusan inventori mereka sendiri dan memutuskan sama ada untuk memperbaiki, mengubah atau meneruskan amalan semasa mereka. Penyelidikan ini untuk memberi tahu strategi intervensi masa depannya bertujuan meningkatkan kadar kelangsungan hidup syarikat pembuatan ini. Ini mungkin dalam bentuk penciptaan kursus pendek yang bertujuan untuk membantu Muehlbauer Automation untuk memperbaiki amalan pengurusan inventori mereka.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to the University Teknikal Malaysia Melaka for giving me the opportunity to write a report honouring my Master of Engineering Business Management Research Project and to my supervisor Assoc. Prof. Dr. Samer Ali Hussein Al-Shami who guided me well by paying more attention to me in preparing this Research Project. I also would like to thank Assoc. Prof. Ts. Dr. Suriati Akmal and Dr. Hambali Boejang for their assistance and suggestions throughout my research methodology on my previous semester. I would like to express my deepest thanks to my parents Mr. Sundra Sagar and Mrs. Santa Maray for always supporting me mentally and physically by giving me words of encouragement. I am very grateful to all my friend and MIEM classmates for helping me survive the stress of starting my MIEM class and not giving up. My endless thanks and appreciation to those willing to help me with their abilities both directly and indirectly.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Research Background

One of the most important tools for manufacturing and production company efficiency is inventory management practice because the company operation will be effect with too much on inventory due to cash liquidity. The formal discovers by (Priniotakis and Argyropoulos, 2018) that inventory management best described as a set of rules of monitoring and controlling inventory level and proper replenishment to achieve company goal. It is important to fix right level of inventory since its involved company performance and money. By contrast, with low amount of inventory its will lost sales and profit. However, management attention will always focused on maintaining inventory level optimum by working towards improving customer satisfaction with minimum stock on hand to reduce operating cost. Inventory management involve in many activities such as developing and managing the inventory levels of raw materials, semi-finished materials (work-in-progress) and finished good. Therefore, some of research studies expert justify that inventory is essential to organization for production process, maintenance of plant and machinery for business operational requirements because results in tying up of money or business capital which could have been used more productively way. Oluwaseyi, (Onifade and Odeyinka, 2017).

Many researcher acknowledges the same thinking as (Sabure, (2020) that had defined inventory as a part of company assets and management will always focus on

company stock level. This is because inventory described as a pile of material used to produce consumer products demanded by customer. It is crucial for proper inventory management in an entity to identify the space between the planed and actual quantity of materials. Therefore, (Fararishah Abdul Khalid and Samantha Reina Lim, 2018) admits that inventory management strategy plays a major role in benefiting a company inventory level. This is because each type of inventory will affect specific commodity and it is important to match the correct commodity and strategy. They agreed that applying multiple inventory management strategy helps organization performance of manufacturing company in Melaka to improve and achieve goals. As a nutshell, to manage a inventory in optimum level, inventory management practise is best way to use as guideline, this is because they finds out that effective and efficient tolls for inventory management practise for foreign manufacture in China (Shen et al., 2017)

1.2 Problem Statement

Many manufacturing company face the challenging situations in running their operation in efficiency way. As indicated by Conveyco in September 2019, reducing stock- outs and overstocks can lower your overall inventory cost by 10 percent, thus 3.34 percent of business have shipped out late because inadequate stock for production. According to (Ugboya, 2019) the company stock level of inventory is important for its successful operation because researcher aware that stock level is one of the independent variable which contribute for company efficiency. Companies holds inventory as part of their assets for business operation. Most companies especially production company holds inventory as the significant part of its current assets. Many problems will arise due to improper inventory management therefore

(Norazira Abd Karim, Anuar Nawawi, 2018) emphasis that the downfall of inventory management will increase the losses faced by company in a financial year. This will lead to manufacturing company financial performance affected negatively. This could be monitor from the stock losses during the cycle count activity at the financial year-end. Muehlbauer Automation yearly stock count activity shows the increasing of scrap parts recently in 2013 until 2020. This is evidenced found from research study by (Panigrahi et al., 2019) which stated that, material managements is the main concern for every manufacturing firms by applying better inventory management and control techniques, thus it will brings for efficient organizational productivity.

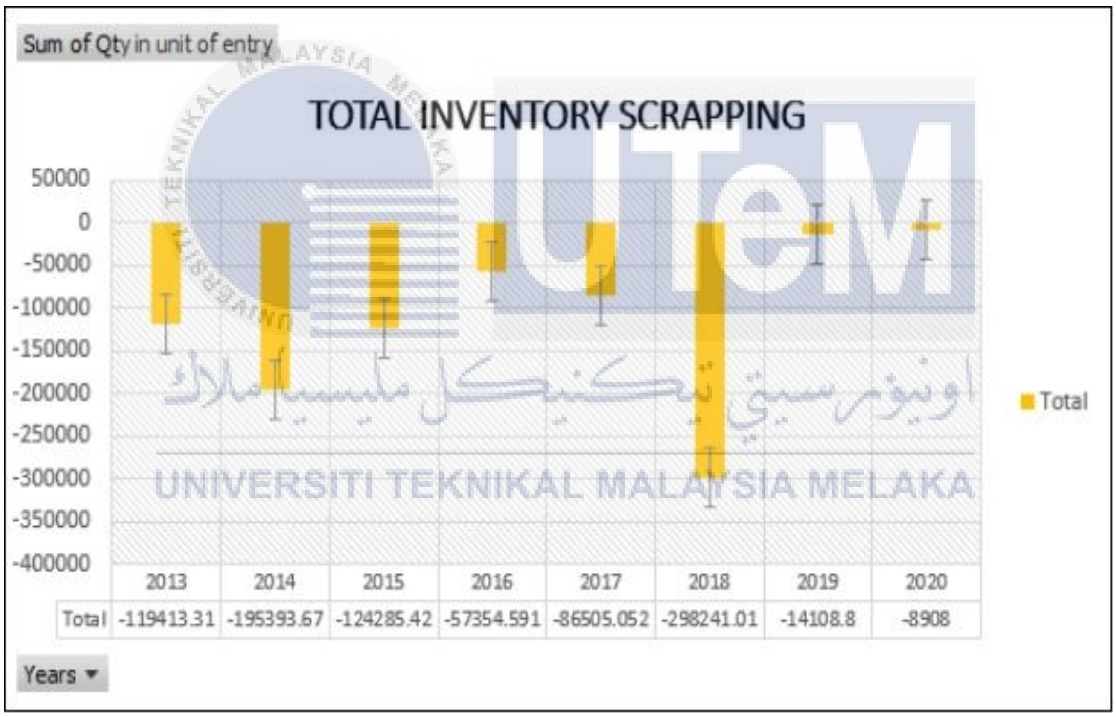

Figure 1.1 Totals of Non-moving and Excess Inventories Scrapping from Year 2013 until Year 2020

Above Figure 1.1 shows data was generate from Enterprise Resource Planning (ERP) of Muehlbauer Automation from year 2013 to year 2020. The highest amount of scrapping show for year 2018, second highest is year 2014 and followed by year

2015. The Figure 1.1 results are shows that Muehlbauer Automation not fully control their inventory management. Main causes of excess inventory were shown in above data because of inventory planning practise, wrong practise in forecasting the demand, lack of ownership towards inventory, lack of part life-cycle management and part life-cycle pricing along with internal practices in organization. (Nnamdi, 2018).

Muehlbauer Automation need to managing and controlling existing inventory management which causes of death stock, excess stock, and non-moving stock. Therefore, there is a studies show that, the need of inventory control is essential to maintaining the minimum stock level and inventory cost which is significant for company profitability. (Inegbedion and Eze, 2019).

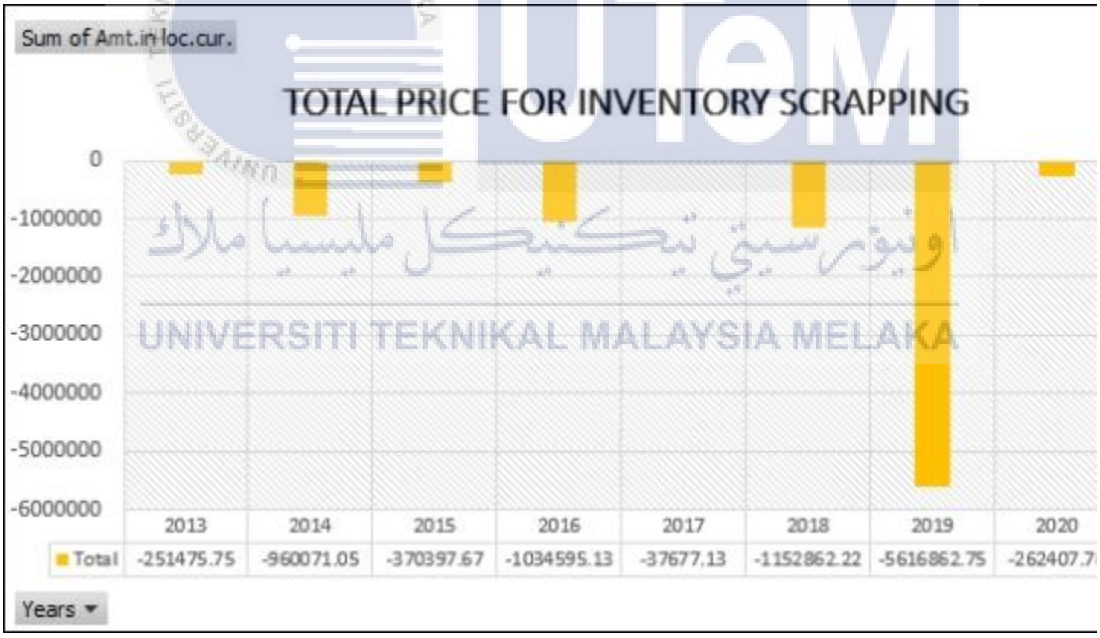

Figure 1.2 Total Price of Non-moving and Excess Inventories Scrapping from Year 2013 until Year 2020

Above bar chart shows, costs and holding cost incurs over a specified time interval when non-moving and excess inventories increasing for year 2019, sum of price is high. To adjust inventory planning practise accordingly before the decrease in

demand occurs thereby eliminating the risk of excess to reduce the cost of obsolescence and inventory holding cost (Nnamdi, 2018). Apart from that, (Panigrahi et al., 2019) declares organization productivity can be achieved by inventory control techniques via proper management of material. This had been the most crucial concern of manufacturing companies. Muehlbauer Automation productivity became effect due to inventory management. Proper inventory management could help to reduce cost burden and increase in productivity and performance of production.

The impact of Inventory management practice on the production performance on manufacturing industry is very important. In this research, the researcher aimed to know the relationship between inventory management practise and organizational performance. Thus, the researchers identified inventory management strategies, Enterprise Resource Planning (ERP), Material Requirement Planning (MRP), and Just-In-Time (JIT), as the independent variables to investigate the research questions. Moreover (Wei, Idrus and Abdullah, 2017) had express poor inventory management and using the manual inventory control had caused serious impact on ABC company daily operation such as delay in product delivery date, which lead to customer dissatisfaction and start to lose customers trust. The manual inventory and monitoring should replace via extending the ERP system with add on the production floors material requirement planning. By implementing the ERP system, the customer sales and delivery could be monitor in real time basis. This will help to gain customer trust and satisfaction.

As wrote in (Sutherland, 2020), had mentioned that their cash liquidity had been better that they expected when introducing the inventory management. The management idea from market had increased their competitiveness. Apart from that, (Sagar, 2020) conclude that the inventory optimization is key element in reducing

business risk for companies. The inventory management software had been the greatest tools for companies to gain better control over its inventory. Inventory management practise most critical need of many industries especially automation industry, Just in Time (JIT) is one of the element of inventory management therefore (Kamran Rahmani and Mohammad Amin Nayebi, 2014) concurs that the accomplishment of JIT had increased the performance. JIT had been a new system introduce with main focused to minimize inventories from having stagnant capital in the form of inventories. A study confirms that the implementation of JIT with automotive industry performance at Malaysia will give positive impact.

1.3 Research Objective

The main research objective is to evaluate the effect of inventory management practices on operation efficiency at Muehlbauer Automation, Melaka. In order to achieve this general objective, the following research objectives for this study were:

- To identify the effectiveness of the inventory management practices used by Muehlbauer Automation.
- To analysis the challenges that is experienced by Muehlbauer Automation from the inventory management practice currently used.

1.4 Research Question

- How effectiveness are the inventory management practices used by Muehlbauer Automation?
- What challenges are experienced by Muehlbauer Automation from the inventory- management practice currently used?

1.5 Scope of Research

This study focuses on inventory management practice at Muehlbauer Automation. The scope of the research is to analysis the influence of inventory management practice on Muehlbauer Automation operation efficiency, analysing the inventory management effect, factor that contribute effect on inventory management and challenges they are facing currently. The research will be conducted in Malacca and limited to employees of the Muehlbauer Automation in responding to a survey of inventory management practise. The interviewees are the managerial and executive level, from various departments such as financial department, warehouse department, purchasing department, planning department, assembly department and production department. The management of inventory practice, effect of inventory, challenges facing by respondent and collecting respondent suggestion were also covered by this study. Data were gathered from management and executive level of the company with specific focus on those responsible people who involved and manage inventory management for their daily task.

Therefore, identify the influence of inventory management practise and company operation efficiency will be evaluated in a specified context of Muehlbauer Automation. Apart from that, this research will focus attention to this neglected aspect of inventory management practise that could make a difference between their success and failure in company operation efficiency. Because of that, the proposed study will encourage Muehlbauer Automation management to gain inventory-management skills if the skills are found to be lacking know-how of managing inventory.

The research will be conducted in the form of a qualitative method that will help to better understand and improving the inventory management practise. This study will be useful in improving the manufacturing industry as a guideline on better

inventory management practices. Inventory management is a critical function in any organization that deals with physical goods. Its significance extends across multiple dimensions of business operations, and its impact can be substantial.

CHAPTER 2

LITERATURE REVIEW

2.1 Research Background

In this chapter, the review of the journals and articles from the past exact examinations will be utilized as direction to this research. Moreover, the applicable hypothetical system will be additionally talked about to plot another reasonable structure and speculation improvement to assess the connection between the applicable determinants will be direct in the accompanying part. This literature review explores the key themes, theories, and advancements in inventory management, drawing from academic research, industry reports, and case studies.

2.2 Inventory Management Practice

Inventory management practices are essential activities conduct by organizations to control stocks of finished products, semi-finished products and raw materials, thus proper implementation of these inventory activities enables the organization to minimize wastage and costs and increase profit. Inventory management is a crucial component of supply chain management and operations management. It involves overseeing the flow of goods from manufacturers to warehouses and from these facilities to point of sale. Effective inventory management balances the costs of holding inventory with the benefits of meeting customer demand. Therefore, wrong inventory management can put the organization operation into the

risk. (Bhandari, 2018). As per narrated by (Atnafu and Balda, 2018) positive impact had been found due to inventory management practice on competitive advantage to organizational performance. A finding shows that the competitive advantage and increased organizational performance had improved the level of inventory management. This enables the firm to have increased competitiveness level against its rivals to outperform them. In addition to that, industry experts are suggesting making inventory practice compulsory since its major role in providing positive results for all sectors involved. The usage of MRP, ERP and many more software could improve the inventory management practice. Experts mentioned that the process includes monitoring and controlling inventory level and to make sure the replenishment took place enough in order to meet customer demands. The optimum level of stock should be calculated correctly since its involved money and affects operations performance (Priniotakis and Argyropoulos, 2018).

On the other hand, (Villarreal et al., 2018) had mentioned that the inventory management practise had made company identify the slow moving products. These products had been sitting more than the average time, which had led to increase of costing. Companies are trying to reduce the amount of slow moving products since its hold cash value. On top of it, the factors for slow moving products also should be monitor such as slowdown in demand, or change of products specifications. Large amount of SKU also a reason for having slow movement products such as the electronic component changes as the new tech take ahead.

Author(s)	Key Findings
Ford W. Harris (1913)	Developed the Economic Order Quantity (EOQ) model, providing a formula to determine the optimal order quantity to minimize total inventory costs.
Taiichi Ohno (1988)	Introduced Just-in-Time (JIT) inventory, emphasizing reducing inventory levels, waste, and improving efficiency by producing goods as needed.
Womack, Jones, and Roos (1990)	Promoted lean principles in inventory management, focusing on value stream mapping and eliminating waste to enhance efficiency.
Axsäter (2007)	Discussed ABC analysis, a method to classify inventory based on value and importance to optimize resource allocation and management.
Hazen et al. (2014)	Examined the impact of RFID technology on inventory accuracy and supply chain performance, highlighting improvements in real-time tracking and management.
Choi et al. (2015)	Explored how advanced analytics and machine learning enhance demand forecasting accuracy, leading to better