

Exploratory Study of Inventory Management Techniques on Organisational Performance

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Abstract: - This study was conducted in AB Technologies Ltd, Malaysia. The main purpose of this research was to investigate inventory management on organisational performance of AB Ltd. The study also focusses on the current techniques of inventory management used at AB Ltd. The study was conducted through case study-based approach, using quantitative and qualitative methods through structured interviews, questionnaires and observations, and literature work. Total 80 respondents of AB Ltd were targeted from various departments for this study. The study revealed that inventory management has an important effect on productivity and positive correlation on organisational performance. However, the findings found that AB Ltd faced challenges while not implementing inventory management systems and no accurate forecast to manage their inventories. Hence, the study aims to provide recommendations to AB Ltd on approaching suitable inventory system and to ensure an accurate forecasting in inventory planning. As vital part in inventory management to maintain consistency of production, effectiveness and organisational profitability.

Key-Words: - Inventory Management, Organisational Performance, Supply Chain Management, Inventory Management Techniques

1 Introduction

Current business world towards to edge of competitive where the manufacturing companies are striving to optimise the manufacturing processes and strategies to fulfil customers demand at the right time without no additional cost. Deferral strategies by manufacturing companies are highly leads to fluctuating in customer's demand and inefficient supply chain performance. Inventory management is one of the crucial areas in Supply Chain to achieve excellence customer's satisfaction in product deliveries and services. The American Production and Inventory Society (APICS) defines that Inventory Management is a branch of business process which comprising with planning and controlling for those stocks used for production with considering of demand (raw materials), supporting processes (maintenance and repair activities) and customer service in exchange activities (finished goods or spare parts) [1]. Inventory management role also includes of new products, current sales products, spare parts, consumables and obsolesce items [2]. It is essential that the inventory plans are well structured and sustaining optimum levels of inventories in order way to response variability of customer's demand without failure [3]. The stocks or inventories are paramount important in business especially in manufacturing firms. Companies are

facing inconsistencies of inventories levels such as high or low stocking, expired stocks, stock out which halts the production process results to failure to meet customer's demand. It is common that in any business, the management being referred to inventory management team if there arise shortage of materials especially critical items which jeopardizing production process. Inadequate inventory resulting to serious challenges and business losses which may occur profitability problems. Thus, well-coordinated and approaching on most effective stock management is necessity to contribute substantially to company's annual turnover. Furthermore, adequate inventory management enables strong and positive relationship between organisation. Since the mid 1980's, many organisations have changed their strategies of inventory management where the primary target has been set to reduce inventory level. The success of Japanese, European and North American firms attained unparalleled efficiency in manufacturing and distribution. Recently, many of these companies have "raised the bar" yet again by harmonising with other parties in supply chains. For instance, the firms were shared the information instead of responding uncertain and variable demand. With this, they noticed that the variability of demand is significantly lower [4]. A research conducted in Kenya where the study identified that practices of

inventory management affects competitive advantage of manufacturing plants. Furthermore, the same study showed that the firm is capable to challenge based on quality and on time deliveries of customer's orders [5]. According to [6] many of organizations have changed their outlook of stocks.

By historically, they viewed the stocks as an advantage for the companies where keeping the high stocks ensuring maximum level of service for customers. In twentieth century, organisations realized that these stocks had values which extremely high. Later then, organisations started to review the stocks as not unreserved benefits, but attentive control and techniques are needed to diminish overall costs. Researchers continuously mentioned that more recently, organisations trying to further reduce stocks to very low through supply chains and the trend toward to assigned inventory management to make sure the operations that move materials or stocks rapidly and efficiently [6]. These are the cases emphasised that using right techniques of inventory management assist to produce considerable benefits in customer service and profitability for the organizations. Inventory techniques plays key role to obtaining optimum level of stocks. Every organisation may decide the techniques that used to control their inventories; it can be one or more which is depending on organisational needed [7].

Many industries face challenges in inventories especially inconsistent level of inventories situation, including wrong demand estimates, poor response to customer's demand, and stock out challenges leading to low performance [3]. Those companies facing challenges in unstable deliveries, decreased customers demand and high production costs due to poor inventory management techniques [8]. Dynamic business world requires an effective inventory management and optimum knowledge of techniques allowing managers to maintain the inventories sourcing and acquisition, when and where to obtain without scarcity towards to organisational performance. Over the years, most of the manufacturing companies are depending on common inventory techniques. For instance, Set par levels, First in First Out (FIFO), Just in Time (JIT) and so on. AB Technologies has observed that the company still utilising outdated inventory management techniques which it may not predict their organisational performance. Thus, the main purpose of this study needs to evaluate the inventory management of AB Technologies Ltd and it's on their organisational performance.

2 Literature Review

This research aims to provide models of theoretical research which are focused for this research. The findings of the earlier studies and researches also presented in the paper for the chosen topics "Inventory Management on Organisational Performance". Supply chain management in any sector of organisations facing pivotal issues to control materials flow from supplier to manufacturing and to end customers. Studies highlights that every success of supply chain management (SCM) is relying on developing particular capabilities which are designing a flexible organisations, creating a trustful relationship between suppliers, seeking co-operation of total supply chain, improving communications to decrease uncertainty demand, inventory level and inventory cost in executing "build to order" in manufacturing firms [9]. Hence, inventory management is becoming a vital part of operational in every organisation in the world.

2.1 Definition of Inventory

Inventory is referring to any type of resources holding economic value which maintaining by every organisation to full fill current and future requirement or needed of the firms and market to stratify the customers. Researchers explained that inventories are stockpiles of goods and materials which available in stock to satisfy the business needed [5]. Accordingly, inventory is defining all the money that the system has invested in procuring goods with purpose to sell [10]. Manufacturing inventories are classified as raw materials, work in progress (WIP) and finished goods and components. Studies highlight that inventory is a set of procedure and controls that need to closely monitor and ascertain in what levels inventories should be maintained and when the stocks should need to replenish. The same emphasised by Goldratt (was an Israeli business management guru) mentioned that inventory is all the money that invested in procuring materials with intends to sell [10]. In general, manufacturing inventory refers to the items that taking contribute of the firm product output. Inventory typically made up with three elements which classified as below:

- **Raw materials:** Materials and components that have been delivered by suppliers to procurer store or warehouse for future production which not yet been used into production line for purpose of conversion process [11].
- **Work in Progress (WIP):** Those materials left the warehouse and begun the conversion to finished goods but not yet become finished

goods. These are the materials considered value added and labour cost incurred [11, 12].

- **Finished goods:** It is referring to completed part that storage in store or warehouse which are waiting to be dispatched to customers, end users, retailers, or wholesalers. These are the finished goods have been inspected and passed the final inspection by quality control [6].

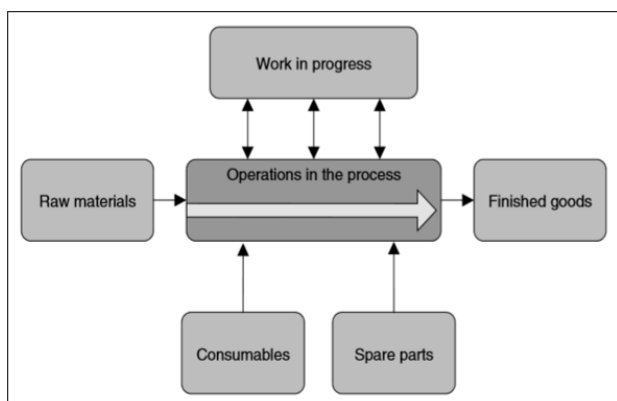


Figure 1: Inventories Types in Manufacturing [6]

Besides that, there have two additional categories which not included into above types:

- **Spare parts:** This refers to machinery equipment which do not access into production process but indispensable to run production process [6].
- **Consumables:** It depends on the nature of the business which it may be paper, or cleaning materials such as brooms, oil, soaps as so on.

2.2 Inventory Purpose

Inventories are one of the important functions in the total production network. An apparent question that “Why do manufacturing organisations holding the inventories”? There are various of answers to this that need for buffer between supply and demand. Hence, the production operations can continue operate smoothly when there are problems [6]. A case study done by [13] highlighted that there are seven reason that manufacturing companies keeping the inventories which includes:

1. To enhance uninterrupted production process.
2. To meet variations in market or product demand.
3. To grant flexibility in production plan and schedule.
4. To decouple consecutive phases of operations.
5. To smooth and level production processes.
6. To take advantage when the prices expected to rise and uncertainties of deliveries.
7. To allow procuring economic lot sizes of stocks and obtaining discounts.

Likewise, researchers specified that five reason for manufacturing holding stocks [10]. There are:

1. To sustain independence of operations.
2. To encounter variation in demand.
3. To ensure flexibility of production schedule.
4. To grant a safeguard for differences in raw materials deliveries.
5. To take benefit of economic purchase orders such as size, price, discounts etc.

From the foregoing, observed that both authors are emphasising virtually the same thing and it conclude that the essential reasons that companies holding inventories are to decrease cost in order to maximise organisations profit. There are three general motives identified by the earliest studies [14] for organisations holding inventories which are [15]:

- **Transaction motive** - propels by business to emphasize the need of maintain inventories to operate smooth production and sales without bottlenecks.
- **Precautionary motive** - is a safeguard against unpredictable changes in the demand and supply. For instance, there may be sudden unforeseen slump or unanticipated delay in materials delivery which needed for production.
- **Speculative motive** - advantage to taken decision by organisation to increase or decrease the level of inventories due to price fluctuations. For example, expected price of material to go up means an organisation may decide to increase the stock level than necessary by acquiring prior to escalation.

2.3 Inventory Control

For all organisations in any sector of the business especially in supply chain management, control of the materials process from suppliers of raw materials to end customers is a crucial problem. The term of Inventory Control defined that availability of the materials whenever and wherever it’s required, coordination, storage, distribution, supervision of the materials supplies, recording the materials movement to maintain an adequate stock level without oversupply or less [16]. Generally, the objective of inventory control is to hold the stock level down in order to make cash for an organisation purpose. As mentioned by [2], the aim of inventory control is to contribute profit by servicing the marketing and financial needs of every organisations. Essentially, the long-term profitability objectives can be classified into operational and financial summarised as following.

2.3.1 Operating Objectives

- *Materials availability:* To maintain enough level of inventories and it should be continuing availability of all type's materials in the firm to facilities uninterrupted production schedule.
- *Avoidance of Wastage:* Up to certain level of wastage is allowed in any sector of organizations but it should be minimum level. To evade from any abnormal wastages, firm need to control on inventories and should be practiced.
- *Avoidance of out of stock situation:* Information of materials should be done continuously to the management so that procurement team able to plan of any types of materials. An optimum level of inventories avoids dangers of shortage.
- *Manufacturing efficiency:* The manufacturing efficiency will be increased when the right type of materials available at the opportune time to run production without disruption which resulting to increase their efficiency. In addition, the motivation level, moral can be rise and improved.

2.3.2 Financial Objectives

- *Reasonable price:* In purchasing process, it is essential that acquired materials at a low and reasonable price but the quality of purchased should not be sacrificed at the lower price.
- *Economy of purchasing:* An adequate inventory control process brings benefits in purchasing as well. Every effort of economy purchasing must be made through quantity and favorable suppliers or markets.
- *Minimize capital investment:* In term of financial point, the general aim of inventory control is to control investment in inventories to maintain an optimum level without excessive investment.

The methods that used to measuring inventories are include [12]:

1. Perpetual inventory method: This method calls for maintaining the movement of each item of inventory with every transaction record such as stock in, out, withdrawal, current stock balance and shows the out of stock as well. It's also known as Balance Stores Record [17].
2. Physical inventory method: For an effective inventory control, an actual count of all the stocks on hand on frequent basis than yearly [10]. The main advantage of this method is discrepancies between records of inventories and quantities on hand able to sort out. This method chosen by organization upon the size and variety of stocks, standardised of work

process and employed processing methods firms.

3. Material control cycle method: A standard system must be designed to control overall material movement from requisitioning of orders to the storage and to finished goods. A standard process must be created, authority and liability for implementation of system should be clearly assigned to individuals.

2.4 Inventory Management

In general, Inventory Management has been defined in many ways by various of authors based on their impression and perception of the subject. In simplest term, inventory management is responsible for all aspects of decisions in stock control and its vital role is to ensure the right quantity of each material held in stock at any time [6]. As same classified by [18] that inventory management as an administration control which is important in all manufacturing includes wholesale and retails companies. As stated by them, principle of inventories is "to have right materials with right quantity and quality, at the right time, right place and with reasonable price while, inventory management is for contemporary companies. Inventory management is defined as a framework of employed in organization to controlling inventory processes includes keeping records and observing of stock level for each material, estimating future demand, to create purchase orders, invoices and control all related accounting of inventories [19]. On other hand, inventory management also described as a system that is utilised by companies to oversee of the materials flow including planning, organising and replacing inventories, storage, managing an adequate supply of materials at the right time while minimising cost [20]. Similarly, studies described that inventories known as a stock of goods which maintained by companies in anticipation of their future demand [21]. In actual, we frequently cannot ascertain consumers demand or ordering lead time. Thus, it's an essential to holding inventories to support uncertainties customers demand to increase organisation profits. This role included with supply of existing sales items, new launching products, consumables, spare parts, obsolescent and other supplies items as well. Basically, inventory management holding two major goals. First, is liable to meet customer requires at the right quantity, quality and most important at the right time. Secondly, keeping an optimal level of inventories to achieve reasonable level of inventory cost to produce organization profits [22]. Also supported by [23], that aim of inventory management is to maintaining inventories at the lowest level of cost might possible

to ensuring uninterrupted materials supplies for on-going production.

Many firms realised that inventory management is one of the potential pathways to upswing the profits while minimising the cost and able to discharge scarce capital. An effective inventory management is important in operation of any business. Therefore, an essential strategy that used by companies to meet their customers requires without risks of shortage while retaining good level of service [5]. When making decision on inventories, the inventory management must finalise compromises between differences of cost component consisting of supplying inventory cost, holding inventory costs and cost of resulting from adequate inventories [24]. The final price of products or services which paid by customers should include by the cost of maintaining inventory. The cost of maintaining inventory throughout the entire process is a hidden cost, but nevertheless becomes part of the product cost [17]. Inventory management still pivotal function for Amazon even though its experiences in cyber world. Michael Dell said that inventory is one of the keys for his company performance. During an interview, Victor Fung of the Hong Kong-based trading firm Li & Fung has mentioned that “Inventory is root of all evil” of companies [1]. Normally, inventories make cost to high in the term of tied up cost of capital, operating and administrating of inventory itself [16]. Same author argued that considering of lead time where the time from ordering materials until deliver for replenishing stocks. Lead time is often long due to the customer’s demand is never entirely known [16]. Almost, all the literature on effective inventory management uses similar criteria which to minimizing cost of organization in order maximizing profits. Therefore, inventory managers should bear in mind how to manage and execute the balancing between good customer service and acceptable cost while satisfying customer’s demand. Furthermore, providing flexibility in inventory service may able to pursue utilization of high inventory while diminishing the wastage because inventory utilization is significant indication of inventory management’s efficiency and effectiveness [25]. Another study stated that inventory managers of every organisation can generate an inventory value by minimising the number of holding days of inventory [26]. Through this effective process, organizations increase operational efficiency while reducing inventory and distribution cost and enhancing customer service.

2.5 Inventory Management in SCM

Supply chain management defined as a term encompasses with planning and management of the entire business flow. The involved activities are sourcing, procurement, conversion, and logistics management where the processes started from supplying raw materials, converting to different levels of production processes and delivering finished goods to customers [27]. Historically, SCM has been seen by academically and its described as a systematic approach. SCM also clarified the differences from classic approaches to managing the materials flow in several disciplines and engaging with quantitative and qualitative tools [28]. Essentially, the *effectiveness* of SCM measured by achieving responsiveness for customers needed while *efficiency* is comparing both input and output of every organisation through SCM practices. A set of processes approaching by organisation to encouraging effective management of supply chain.

Material management, operations, information technology and customer service are the components of SCM practices [29]. To support this, [30] mentioned that other factors such as cost, inventory management, technology and competitiveness has always been an essential where it should have to managed effectively by organisation to reach the goals of SCM. The companies those approaching their SCM practices effectively may have direct effect on overall organization performance mainly in financial and marketing [31]. Indeed, studies emphasizing the pertinent on SCM practices and its anticipated to enhance overall organisation’s competitive included investment and return in market shares. For instance, [32] asserted in their research paper that practices of inventory management particularly procuring practices, broader supply chain integration between suppliers, customers and organisations showed the largest effectiveness in supply chain strategy. Another study emphasised the same that effective practices of inventory management have positive effect on inventory performance and the entire business performances [33].

2.6 Inventory Management Techniques

The role of inventory management is very pivotal where the common process of inventory management in every organization is tracking the stock in order to fulfil the customers needed. It’s often that an effective inventory management practices answer to the questions: “How to determine the stock level? What to order? How much quantity should be ordered? and When the inventories needed?”. There are numerous of inventory techniques playing

significant role in planning and replenishment of inventories. A company may determine the technique depending on the nature of business or their organisational needed. Generally, it would be one or several of techniques which very useful in the sense of helps to track the inventory movement [22].

2.6.1 Economic Order Quantity (EOQ)

The traditional approach of Inventory Control by many organizations. This model used to figure out an optimal quantity that can be acquired or produced to diminish the cost of inventory, processes of material purchase orders, production set up where able to minimize the total cost of organizations in holding and ordering of the year. The general model of inventories offered for all, but the model quite restricts to suitable in manufacturing materials where the materials under consideration has no connection between other parts and demand which statically forecasted which may need to utilize productive capacity [13]. EOQ is a logical way of technique that every firms able to aware when to order and how much quantity to be ordered [34].

The EOQ model is underlying on certain assumptions that help the companies from any sectors to comprehend their weakness and shortcomings. Without this, EOQ model not able to work towards its optimal potential. Following are the assumptions of EOQ model.

- The cost of ordering is constant.
- Known the demand of the year, evenly spread and sustained throughout the year.
- No delay and instantaneous stock replenishment
- Purchase order price (per unit) of every item is constant without any discounts.
- No constraints on order lead time
- Backorder is not permitted.

2.6.2 Just in Time (JIT)

The JIT technique was pioneered by Japanese where the concept is very simple that organizations or manufacturing firms are obtaining the inventories only when needed. This system also known as a "Zero stock inventory". By approaching this JIT technique, the business able to enhance the investment while reducing of inventory holding cost. Furthermore, application of JIT brings an effective planning in production, tighten the inventory control system, increase quality of products and service, decreasing unwanted stocks, expenses and eliminating wastages [2]. Even though, JIT is a simple but [6] emphasised that high possibility to decimate the stockholding of organisation if it's not works successfully. The quality of materials and parts must be high and defective materials could halt the

manufacturing operations which may resulting to failure to meet customers required. Thus, reliable relationships are needed between suppliers for smooth operations. Ideally, it's encouraging to having suppliers nearby to the companies with trustworthy transportation services.

2.6.3 ABC analysis

The ABC (Always Better Control) is well known and utilized by most of firms to analyse their inventory. Under this technique, the inventory or materials are classifying into three categories such as A, B and C according to their respective inventory value and significance of cost. It is essential that ABC analysis method based on turnover. The exact percentages are adhered too but it's less important when comparing with turnover. In some cases, there have further classification "category D" where this group comprises with huge number of low turnover materials. The main purpose of this method is to ensure availability of stocks to fulfil the demand with lower amount of cost and effort [2].

2.6.4 Material Requirements Planning (MRP)

MRP is a system most broadly using by manufacturing firms to support in planning and control of inventory system, automate manufacturing activities, scheduling and calculating the materials or components that needed to produce a goods. MRP system begin with master schedule where the bill of materials for each product need to be accurate which is important to determine the production needed. Then, MRP converts the data to show timescale of required materials and it's helping to schedule the orders with suppliers and for further internal usages [6]. The common goal of MRP are to ensure the minimum level of inventory, to provide high service for customer needed and co-ordinate all the activities including purchasing, delivery schedules for both production and purchasing processes. The ability of MRP systems allow any types of business to re-planning and response rapidly to the changes of demand.

2.6.5 Determining inventory level

The basic technique of managing inventory by quantity is determining the stock level for each commodity which are recorded of every stock movement as a point or signal when the action needed by inventory management [35]. This is one of the crucial techniques where it allows the companies to maintain an optimum level of inventory. Besides that, it's also helps to retain the stocks for safety purpose if in case any unexpected fluctuating in demand.

Every company determines inventory level in following ways, but depended on their business [35]:

- a. Minimum level of inventory: It's represents that minimum quantity of inventory holding by companies before replenishment of new stocks.
- b. Re-Ordering level: It is the level of inventory that company should place with new order to get back the materials before falls to minimum level. The re-order level normally calculated depends on lead time of orders replenishment plus safety stocks.
- c. Maximum level of inventory: This means; the quantity of inventory should not exceed the limit. Those stocks over the limit consider overstocking.

3 Research Framework

The main aim of this research is to analyse the inventory management and the performance of AB Technologies Ltd through reviewed by techniques of inventory management. The broad objective of this study is to understand the overall inventory management on the organisational performance of AB Technologies Ltd. Following are the specific objectives of this study:

- To conduct literature review of inventory management.
- To investigate the techniques of inventory management used at AB Ltd.
- To produce an inventory management strategy for AB Ltd to improve efficiency in the future.

The following basic questions were formulated to guide the research:

- What are the inventory management techniques being practiced at AB Ltd?
- How do the inventory techniques affect their organizational performance?
- What is the relationship between organization performance and inventory management of AB Ltd?

The findings from this research will assist to impact on the society especially for those are relating in inventories, manufacturing process and supply chain field in the following ways. The study will show an overall of inventory management and its practices or techniques are used in AB Technologies Ltd. Thus, the findings of this study may be useful as a fundamental for further research and upcoming investigation in term of literature. The information from this research may beneficial for managers or staffs working in AB Technologies Ltd or different organisations especially encouraging them to gaining knowledge on how to do comparison between

inventory management and actual performance. It may also be an advantageous to future researchers to analyse further about the effect of inventory management practices on manufacturing performance or any other organisations. The research aims to undertake case study approach using mixed method combining with qualitative and quantitative methods.

Research Question 1: What are the inventory management techniques being practiced at AB Technologies Ltd?

No		5	4	3	2	1
		SA	A	U	SD	D
1	There are various techniques of Inventory Management used at AB Technologies Ltd.					
2	The responsible employees are clearly understood the term of Inventory Management at AB Technologies Ltd.					
3	AB Ltd adequately manages its inventory by keeping accurate and up-to date records.					
4	Raw materials and consumables are the most consuming inventories in AB Ltd.					
5	The materials are reviewed and acquired on Stock Review basic at AB Ltd.					
6	Bin Card used to record the physical movement of materials in AB Ltd.					
7	Monthly stock checks help to improve performance of inventory management at AB Ltd.					
8	Inventory Control System used in AB Ltd to manage the stock movement by systematically.					
9	Forecast is one of the essential techniques used at AB ltd to replenish the inventory levels.					

Table 1: Research Question 1 Data Questionnaire

The quantitative survey approach allows to quantify and illustrate the existing practices at the company AB Technologies Ltd. It also measures the impact of inventory management practices in actual on organizational performance of the company. Thus, the area of study was conducted on micro and small-scale manufacturing company which producing thermal protectors and temperature limiting switches. The research is intended to understand the common techniques of inventory management used at the company and its correlation between inventory management organisational performance. This research also considered the challenges faced in inventories by the chosen company.

Research Question 2: How do the inventory techniques affect their organisational performance?

No		5	4	3	2	1
		SA	A	U	SD	D
1	There is positive relationship between inventory management and organizational performance.					
2	Inventory management planning and scheduling the inventories according to their importance.					
3	Inventory Management helps in effective material management of AB Ltd.					
4	Customer service has been improved through inventory management practices.					
5	Inadequate inventory practices affect organization performance of AB Ltd.					
6	Process of purchasing/procurement are improved by practices of inventory management.					
7	Inventories held in AB Ltd Store are most for executing customer's orders rather than for storage or buffer.					
8	Inventory management effectively reduced the cost in AB Ltd.					

Table 2: Research Question 2 Data Questionnaire

4 Case Study Research: AB LTD

In 1992, AB Technologies Ltd, also known as AB Ltd was established in Malaysia by the parent company from Germany. AB Ltd commenced production with 180 of local employees and currently this number has been expanded to 720 of employees. In global market, AB Ltd is one of the universal leading manufacturing company which specialise in developing bimetal thermal protectors. The company major operations are producing thermal protectors and temperature limiting switches and their products mainly preventing of electrical windings and equipment from overheating. Figure 2 is showing internal supply chain of AB Ltd.

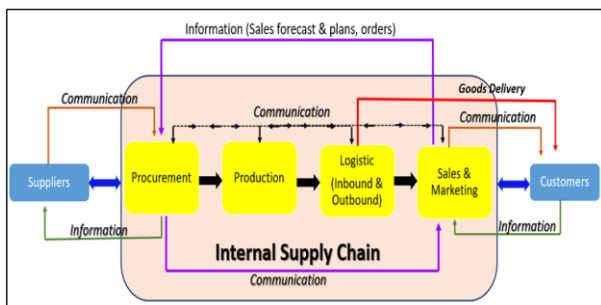


Figure 2: Internal Supply Chain of AB Technologies Ltd.

All the AB Ltd products are certified by international standards. Generally, their targeting market is an 'Electric motors' of business and mainly for AC

market (Alternative current) such as HVAC (Heating, ventilation, and air conditioning), transformers, ballast, heaters, machine parts and electronic components. Besides that, AB Ltd is the largest and most essential subsidiary company for the parent group which conducts sales and marketing in the Asia-Pacific region. AB Ltd products are producing with three main materials such as lead wires, switches, shrink caps and supporting with consumables items. The components to assemble switches and core material to produce shrink cap are acquiring from Germany and Romania. While, the lead wires are procuring from abroad as well such as Switzerland, USA, China, Hong Kong, and Sengapore.

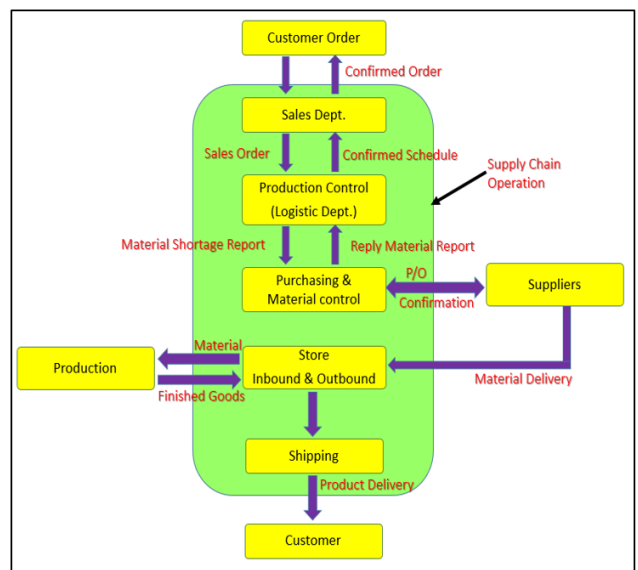


Figure 3: SC Process Flow of AB Technologies Ltd.

Figure 3 reflects the overall process flow of AB Ltd supply chain. AB Ltd supply chain is very simple and straightforward. Planning, sourcing materials efficiency in manufacturing process are the key features in their supply chain especially supplying the products to customers at the right time without failure. The consumables items are from domestic suppliers. According to [36], a supply chain activity involves with continual process and every organisation has its own set of market, unique operations and demands. A supply chain not only includes manufacturer and suppliers whereby its connecting with transporters, warehouses, retailers, and customers [37]. Similarly, AB Ltd products are unique set, reliable and innovation company for renowned brand manufacturers in global market. The company also developing solution of thermal protection and supplying and furnishing them directly to customers.

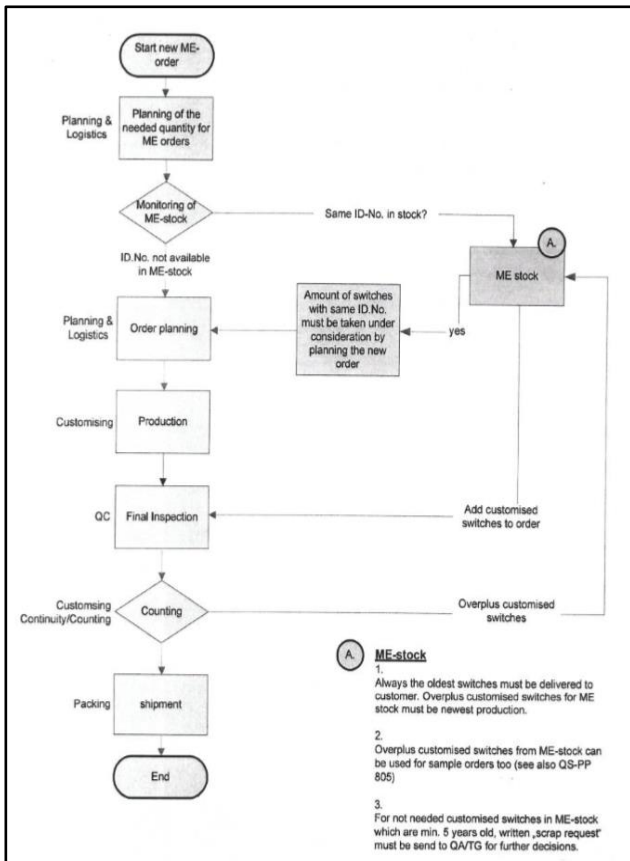


Figure 4: Overall Order Process Flow of AB Technologies (Source: Adopted from AB Ltd Work Instruction (WI))

5 Data Analysis and Findings

The analysis of data and interprets the findings of the study in line to reinforce the research objectives which included the study on inventory management techniques used by AB Ltd. Formula of Likert Scale and Weighted Mean Score has been used during quantitative data analysis. Weighted means scale is an average data where each data is multiplied by a predetermined before calculation in term of purpose to treat equally of data.

$$\bar{X} = \frac{\sum WF}{N}$$

W: Weighted Means Scale (WMS); F: Value of category; N: Total Population

The respondents given their responses by inform of Strongly Agree, Agree, Undecided, Strongly Disagree and Disagree, where:

- Strongly Agree = SA = 5
- Agree = A = 4
- Undecided = U = 3
- Strongly Disagree = SD = 2
- Disagree = D = 1

Total: $15 \div 5 = 3$, the Weighted Means Scale considered that 3 and above is positive and below 3 is negative. The findings are tabulated in below table 3 and table 4. According to above table 3, the questions were drafted to investigated into techniques of inventory management used in AB Ltd and to understand employee’s knowledge on processes of inventory management in line to attain first research objective. The main reason was to set up the strategies and to ensure proper organisational performance in AB Ltd.

No	Responses	Frequency	WMS%
1	There are various techniques of Inventory Management used at AB Ltd.	SA 46	4.38
		A 25	
		U 5	
		SD 2	
		D 2	
2	The responsible employees are clearly understood the term of Inventory Management at AB Ltd.	SA 32	4.21
		A 39	
		U 5	
		SD 2	
		D 2	
3	AB Ltd adequately manages its inventory by keeping accurate and up-to date records.	SA 50	4.52
		A 20	
		U 3	
		SD 1	
		D 1	
4	Raw materials and consumables are the most consuming inventories in AB Ltd.	SA 25	4.31
		A 45	
		U 5	
		SD 0	
		D 0	
5	The materials are reviewed and acquired on Stock Review basic at AB Ltd.	SA 15	3.62
		A 35	
		U 20	
		SD 5	
		D 5	
6	Bin Card used to record the physical movement of materials in AB Ltd.	SA 37	4.36
		A 40	
		U 0	
		SD 1	
		D 2	
7	Monthly stock checks help to improve performance of inventory management in AB Ltd.	SA 40	4.30
		A 28	
		U 9	
		SD 2	
		D 1	
8	Inventory Control System used in AB Ltd to manage the stock movement by systematically.	SA 0	1.56
		A 0	
		U 3	
		SD 39	
		D 0	
9	Demand forecasting is one of the essential techniques used at AB Ltd to replenish the inventory levels.	D 38	2.41
		SA 0	
		A 5	
		U 35	
		SD 28	

Table 3: Inventory Management Techniques at AB Ltd.

For a qualitative result, interviews were conducted to further confirmed that the techniques of inventory management used at AB Ltd. According to Head of Logistics, Stock Review, Bin Card System and Stock Count are the techniques approaching by the company. Respondents also strongly reported that the company doesn’t have proper inventory control system to manage and control the processes of inventory management by systematically. This is obviously can see in table 3 where the WMS value for question No.8 is negative, 1.56%. As discussed earlier, AB Ltd still depends on manual records while using Microsoft excel, manual stock cards and customer orders processing via email enquiries and shipping documents such as invoices, packing list and so on are prepared with using Excel sheets. The second problem was identified that no proper demand forecasting provided by Sales team where the questions No.9 in table 3 shown the WMS value

2.41%. Total 28 respondents strongly disagreed while 12 respondents were disagreed which the inventory planning not planning and scheduling according to forecast demand. During interviews, researcher also sought to understand that AB Ltd was acquiring materials based on customer requirements and the questionnaire survey revealed that 37 respondents strongly agreed for the statement that inventories held in AB Ltd Store are most for executing customer orders rather than buffer. In general, forecast is a prediction of future circumstances and it's a crucial requirement for all business especially for inventory planning. Earlier studies have identified that lower numbers of inventories are intolerable and undesirable that causes disruption for production strategies and order completions [38].

or negative which it relies on the method that applied by inventory management. Most interviewed participants explained that effective inventory management sustain quality of the company services included time management during the processes. Some still argued, with proper materials handling the company able to reduce labour costs which connected to enhanced performance of the company and its operations. Unrealistic inventory plan may cause to narrow down the business performance, lead to inventory shortage and bottleneck and delayed deliveries [39].

6 Conclusions and Future Research

Inventory is one of the significant assets in every organizations and effective inventory management is a vital key in the favorable of operations of organisations. Inventory management of AB Ltd. which co-ordinates the purchasing with suppliers, production process, and customer deliveries includes logistics planning to meet the markets demands and organizations performance to achieve company objectives and customer satisfaction. With respect to the findings of the research, Stock review, Bin Card System and Stock Count are the common techniques using by AB Ltd. An effective inventory management was associated with proper material handling which is one of the essential roles on the organisation performance. In addition, proper customer services, controls quality of company products, reduction of labour cost are helps organisations to reduced costs incurred in line to improved company performance. The findings of the study also noted that the monthly stock taking has affected positively the performance of inventory management where the stock variance was corrected by both physical and manual system. Finally, the study found that the company does not engaged with any inventory control system to maintain and supervise the processes by systematically.

Furthermore, there is no proper demand forecasting provided for effective inventory planning and scheduling. Strategic of inventory management makes every organisation to more efficient but it is quite challenge for most of organizations. As a result of this research, the following are the recommendations have been suggested for AB Ltd to improve its efficiency in inventory. In digitised and technological era, if still relying on manual inventory management system means it's inefficient and limited for business. Commonly, manual system is operating by humans which is high potential for errors even though sometimes most diligent employees also possible to get mistakes. The errors

No		Responses	Frequency	WMS%
1	There is positive relationship between inventory management and organisational performance.	SA	29	4.06
		A	38	
		U	5	
		SD	5	
		D	3	
2	Inventory management planning and scheduling the inventories according to their importance.	SA	43	4.40
		A	30	
		U	4	
		SD	2	
		D	1	
3	Inventory Management helps in effective material management of AB Ltd.	SA	29	4.14
		A	38	
		U	10	
		SD	1	
		D	2	
4	Customer service has been improved through inventory management practices.	SA	39	4.34
		A	33	
		U	5	
		SD	2	
		D	1	
5	Inadequate inventory practices affect organisation performance of AB Ltd.	SA	25	4.06
		A	38	
		U	15	
		SD	1	
		D	1	
6	Process of purchasing/procurement are improved by practices of inventory management.	SA	36	4.28
		A	32	
		U	10	
		SD	2	
		D	0	
7	Inventories held in AB Ltd Store are most for executing customer's orders rather than for storage or buffer.	SA	37	4.28
		A	34	
		U	5	
		SD	2	
		D	2	
8	Inventory management effectively reduced the cost in AB Ltd.	SA	30	4.19
		A	39	
		U	8	
		SD	2	
		D	1	

Table 4: Relationship of Inventory Management on Organisational Performance

Table 4 shows the responses to find out the significance relationship of inventory management on organisational performance of AB LTD. The reason was to explore whether employees were aware that inventory management and its practices contribute to organization performance. Based on the study, there is a positive effect and relation between inventory management and organization performance. The findings indicated positively 4.28% which the organization promptly react for productivity even though the materials purchasing upon customer requirements. Some qualitative results claimed that the relationship of inventory management and performance can be either positive

in inventory control management can leads the company to profitability lost which includes poor in customer services, time-consuming and frustrating for employees especially when stock out, stock discrepancy and so on. Thus, AB Ltd should automate their inventory management where the system much more easily to handle the arduous task in efficient way. The stock level of inventory can be tracked, up-to-dated, and providing real time of inventory level which able to act promptly to customer's queries.

An accurate forecast is most essential part in inventory management. AB Ltd. Sales team should update about the predictions of future customer orders. It is very helpful to inventory management especially during peak time, seasonal occasions, promotions and so on. An accurate forecast helps the business of AB Ltd. to know the best-selling materials, worst-selling materials and what is trends of market which is advantages for AB Ltd to satisfy the customers demand without disruptions. Furthermore, consistent demand forecasting allows the company to achieving a good turnover.

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