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THE IMPACT OF JUST IN TIME ON THE INVENTORY MANAGEMENT: THE CASE OF AL TAYAR PLASTIC MFG. CO.

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ABSTRACT

With today's advancement in technology and evolvement in the production, manufacturing and operation techniques, many companies are trying to find and implement new strategies in order to improve work performance, production and service quality, have competitive advantage and a fast response to the demands while keeping the costs low as possible. Many organizations started implementing Just in Time (JIT) method in different aspects in the business including the inventory management. The main purpose of this study is to analyse the impact of adopting Just in Time on the inventory management system at Al Tayar Plastic Mfg. Co. Both qualitative and quantitative methods were used in this study for collecting data. Interviews have been conducted with the management of Al Tayar and secondary data were used in order to elaborate the JIT application and how to properly implement the method taking into consideration inventory management as a key of measurement. From the obtained results, the implementation of JIT had a positive impact on the inventory management system at Al Tayar.

INTRODUCTION

Just in Time (JIT) is a Japanese management approach which has been invented in the early 1970s by Toyota's vice president, Mr. Taiichi Ohno in order to be able to meet the customer's demands with the least delays while at the same time eliminating waste. The whole idea had started and was created when Toyota wanted to meet specific demand of customers. Moreover, according to Javadian et al. [1], with the shortage in the oil and natural resources, the use of JIT had become commonly used for survival. After that, a lot of Japanese and Western companies had started to integrate the approach

during production. Hence, JIT became a world-class competitor for world-class manufacturing in addition to the key success to millions of companies. As a result, the “pull system” has started to be acknowledged [2].

Just in Time (JIT) seeks to produce only the required items at the required time and in the required quantities. Hence, it is one of the effective means to control inventory flow, prevent its storage and manage it effectively [3]. Without this, too much inventory will consume physical space, creation of a financial burden, and an increase in the possibility of damage, spoilage and loss [4]. Having a balance between JIT and the inventory management is vital for a successful integration and a high outcome. An inventory system provides the operating policies and organizational structure for maintaining and controlling goods to be stocked [5]. For the implementation of JIT to take place, many factors must be considered. These factors include the top management which they must accept the idea of JIT, employees should understand the importance of JIT concept, setting up an enterprise resource planning (ERP) to integrate all the data and processes of an organization into a single unified system, testing the system after implementing JIT, testing for successful existence and controlling the development of the JIT system and feedback loops [6].

Quality management makes sure that the value of the company’s products and services are satisfying the needs, wants, and demands, steady and consistent while at the same time, in line with the organization’s quality policy and objectives. Kumar [7] had explained the features of JIT based on quality management that is needed to continuously improve the quality, eliminate waste and reduce costs. JIT needs a proper and well-developed suggestion system that includes the employees during the productions and operations. Allowing employees to generate large number of propositions and managers to implement these ideas will lead to nonstop enhancement. However, there must be a good relation between the employees and the manager, different motivation techniques, continuous training and an open organizational culture. Also, JIT requires standardization of methods in order to strengthen new levels and to be able to analyze the statistical data for quality control. JIT encourages the suppliers to be commitment in supplying excellent quality products by applying a permanent quality program and constant communication between buyer and supplier.

JIT is more important to large companies compared to small ones [8]. The Dell Computer Corporation has also been affected by JIT technique. Being one of the leading sellers of PC's had made the company’s approach of using JIT to be different from the others. Serem [9] had stated that JIT requires all parts to go through the system immediately however, Dell used JIT in a different way. Dell forces their suppliers to achieve the JIT goal and to carry the inventory. After that, Dell demands short lead times on the components which later are assembled quickly and shipped. Hence, the company is able to provide short lead times to their customers.

Considering the fact that the success of any business involves having low waste, low stocks and low capital tied up in the inventory, many organizations

find it difficult to find a technique that helps in managing the inventory, knowing when to order the next shipment of materials and the quantity of resources that will be needed for production. Therefore, this study identifies the impact of adopting Just-In-Time in the inventory management system at Al Tayar by collecting information and data from many different aspects related to the strategy and the inventory of the company.

METHODOLOGY

Research Design

This is a mixed-method research that is based on the case study of Al Tayar Plastic Mfg. CO. Both the qualitative and quantitative methods were used in this study. The qualitative method helps in gaining knowledge and understanding the reasons, opinions, and motivations behind the topic in addition to helping in developing new ideas. However, the quantitative method stresses on the measurements, statistical, and numerical analysis and techniques used.

The interview and surveys were used in this study to gather the primary data. Also, the primary sources documents from Al Tayar included annual demand, order and production costs, budget, and delivery time of raw materials. On the other hand, the secondary data were used in this study mainly from books and journal articles.

This study used a descriptive research design as real data and information of the previous situation of the inventory management, the techniques that were used, and its affects had to be collected in order to be compared with the results of implementing JIT.

Data Collection Tools

Interviews were conducted with Al Tayar's managers and employees in order to have a clear idea on the company operation. The survey material was prepared and distributed to their operational employees. The questionnaire covered three general questions regarding their working's position, working's experience and prior knowledge to JIT technique. Besides that, the respondent also required to answer verbally on some questions. The Likert scale method was used for certain question where 1 for "strongly disagree", 2 for "disagree", 3 for "neither agree nor disagree", 4 for "agree" and 5 for "strongly agree". Also, for the interview, there were no restrictions as the employees answered with the way that felt comfortable.

Participants

The targeted participants were four different categories which were: the owner of Al Tayar Plastic Mfg, the head of departments, the top management, and operational employees. These categories have been selected in order to be able to gather information and know more about the activities and the challenges faced inside the company's inventory and operation process.

The owner was interviewed for the company's past and current activities including the strategy used to operate the company, the challenges that had occurred from the strategies and the impacts they had on the business.

Meanwhile, the head of departments were interview for the inventory cost of the company for year 2013 and 2014, the forecasting results for 3 years regarding the purchasing of raw materials and components, and how much money is put as a budget in purchasing the raw materials for the projects.

The top management that was interviewed were the managers of the inventory, production and operations. Therefore, this study obtained different information such as the quantity of raw materials that are ordered, when Al Tayar conducts the order, and the number of stocks that are usually held in addition to that will be held in the inventory. Also, the types and rates of the waste and production that the company dealing with.

For the last category, a sample of employees were chosen at random for the questionnaire, in order to know the thoughts and opinions on new strategy that will be implemented, whether they are with or against new strategies, and what are the challenges that are faced.

Data Analysis

This study used descriptive statistics with frequency distribution method to analyse the questionnaire data.

RESULT AND DISCUSSION

With the intensive competition among Al Tayar with other local, national, and international companies and consumers demanding high quality and reliable products in addition to fast delivery, it is important to implement a strong inventory management strategy. A total of 83 responses were participated in the questioners and surveys of this study. Table 1 shows the demographic data of the respondents. The respondents covered of one owner of Al Tayar, 24.1% each of the head department (engineering and development department, packaging department, production planning department, corporate strategy planning department and quality assurance department) and top management (production manager, operations manager and the inventory manager). There are 50.6% of the respondents are from operation level which are supervisors/foreman, office manager and employees with other positions.

Table 1: Demographic Data of The Respondents

Characteristic	Category	Count (n)	Percentage (%)
Working Position	Owner	1	1.20
	Head of Departments	20	24.10
	Top Management:	20	24.10
	Operational Level	42	50.60
Working Experience	5-10	10	12.05

(Year)	10-15	24	28.92
	15-20	27	32.53
	Above 20	22	26.51
Prior knowledge to JIT technique	Yes	59	71.08
	No	24	28.92

Based on Table 1, the respondents mostly with working experience 15 to 20 years about 32.53%, follow by 10 to 15 years and above 20 years about 28.92% and 26.51% respectively. This indirectly reflects the employees are aware of the techniques and strategies that are used in manufacturing, production, and operations, and how they adapted to it. Besides that, majority of the respondents about 71.08% are with prior knowledge to JIT technique while 28.92 do know the knowledge to JIT technique.

Owner's Answers

Knowing the overall strategy of the business was something on the top of the list. It is important in order to have a clearer idea of how the company operated. The strategy that Al Tayar uses must be within the concept of making sure that the production is diversified and ensures that the products are being sold to consumers worldwide. There is no one specific operational strategy. The strategies that are set depend on the situation of the market, competition, type of production and much more factors. As a result, Al Tayar had changed its techniques and approaches that were used in order to keep improving and due to some challenges. For that, the two main reasons that made the company change the previous strategies that were used are the advancement in technology and the continuous innovation. With technology, the company was able to keep all the customers, employees, contracts, and suppliers' information saved. Al Tayar can easily track any changes made regarding the data stored. In addition, relationship with the suppliers became better. In the past, it was hard to keep track of the shipments or to know when to order which had caused a lot of problems. Sometimes, the warehouse would hold extra unwanted number of raw materials which consumed a lot of space and money. However, nowadays, the equipment are computerized and developed in a way that information can be easily sent between the company and the suppliers or the company and the customers in addition to messages sent automatically from the company once there is a need for raw materials. Also, the designs of the products have been improved. The company is able to make a three-dimension image of the product and then apply changes if needed. Sometimes, some old parts of the products designs were only needed to be changed or improved instead of creating a new design. Therefore, this had speeded the production process, facilitated efficiency and saved time. In addition, a lot of calculations that were made contained errors in them due to data being entered manually but data are entered once and there is low rate of errors. Moreover, changes in the model of the business are required in order to be able to adapt to the changes that occurred in the environment and market. With the years, competition in the market had increased which had pressured Al Tayar to improve the approaches that are taken. Also, competitors had studied the strategies and techniques Al Tayar used which meant the uniqueness had disappeared. Therefore, innovation was needed to be made in

order to stay in the lead. With that, the company was able to still succeed and be one of the well-known companies.

Head of Department's Answers

This study obtained the cost for the year 2013 and 2014 from the head of department. This includes the cost of raw materials, spare parts and finished goods in addition to the cost of work in progress and finished goods which are the cost of material, labour and an appropriate allocation of indirect overheads. This study obtained the results of the cost of the inventories for years 2010 till 2014. However, AL Tayar was yet to forecast the cost for years 2015 and 2016. Figure 1 shows the data for the previous years. There was a gradual increase in the cost from 2010 till 2013 however in 2014, there was a decrease. Also, the amount of money spent in year 2014 on purchasing the raw materials and equipment was approximately 1,442,140 (SAR' 000).

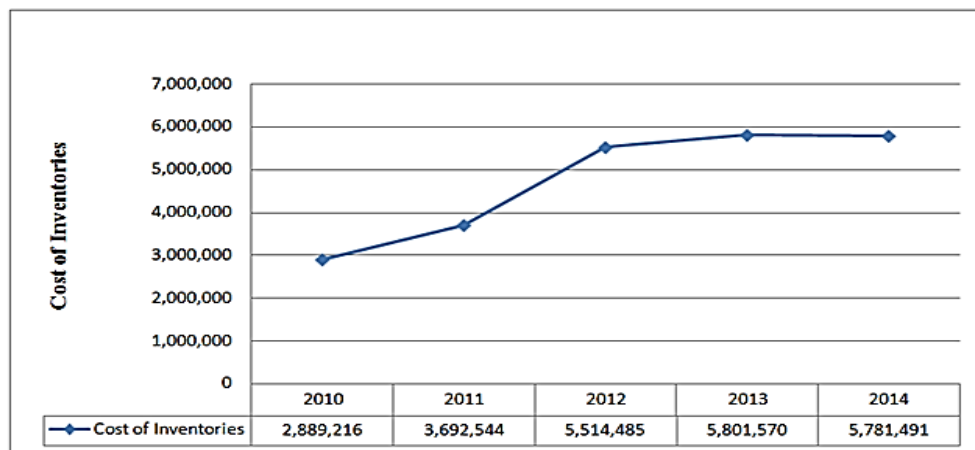


Figure 1: The Inventories Cost of AL Tayar for Years 2010 Till 2014

Top Management's Answers

Furthermore, this study found two main inventory strategies that are used by AL Tayar during the interview which are ERP software and Just in Time. ERP software is contributing to the efficiency and effectiveness of the company. The ERP software function is to integrate applications, operations, departments, planning, consumers, suppliers, manufacturing and branches of the company which increases the efficiency of the production in addition to the lean manufacturing. With this, the company is having better control over what is being purchased, the demand levels, flow of information, operations, and production rate. The company believed that the implementation of JIT had made a dramatic change in a lot of aspects in the business. First and foremost, the most important factor is the cost and the delivery time. The interviewed managers had stated that having excess stocks in the inventory was a big challenge for the company as it consumed money and space. The holding and ordering cost were high and illogical. Some of the managers had mentioned that the production level was not stable, the information gathered were not used efficiently, and that not all the employees were able to be trained and

gain skills regarding anything new. Moreover, the managers had agreed that they can provide expertise and knowledge when it comes to JIT implementation and that they believe that there is a moderate and fair amount of effort in making sure JIT is properly used.

Figure 2 demonstrates the company's experience in JIT characteristics. Majority of the management strongly agree and agree that the company has experience in JIT characteristics such as flexible workforce, reduction in work in progress, quality control, reduction in set-up time and great teamwork. While, about 50% each is neither agree nor disagree for smaller lot sizes, facilities will become complicated, production will get complicated but better and elimination of waste.

Besides, this study had showed that storage problems had occurred from before and that the orders are conducted quarterly (every 4 months). However, quantities of the raw materials of components that are needed for production differs and depends on the demand therefore, there is no fixed amount. In addition, raw materials are delivered and stay in the inventory between 2-6 months of ordering.

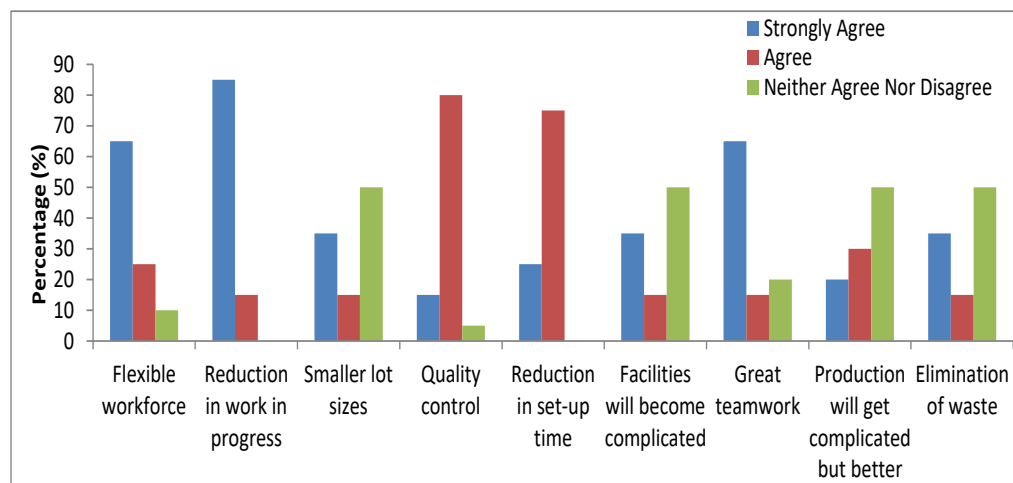


Figure 2: Company's Experience in JIT Characteristics

Operational Level Employee’s Answers

Figure 3 shows majority of the respondents about 69.05% agree, while 7.14 disagree with the new strategy’s implementation. There are 23.81% of the respondents are neutral with the new strategy’s implementation.

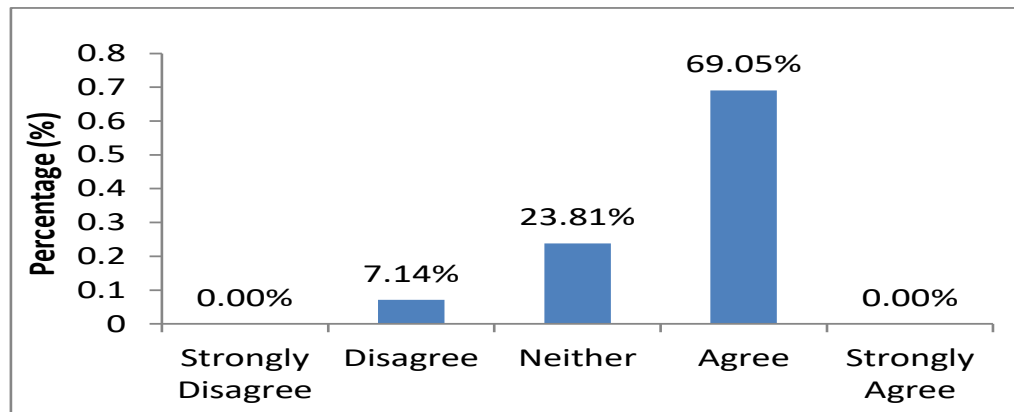


Figure 3: Response on New Strategies Implementation

Based on Figure 3, this study had showed that the challenges that are faced when a new technique is to be implemented are first, not having a clear plan or an outline that explains clearly how and what the change is in addition to not knowing how to use it. Second, having some of the employees disagreeing and not on board with the change causes a lot of drawbacks which causes some of the projects and production to be late. Also, miscommunication is one of the big factors that half of the respondents had mentioned. Miscommunication had caused some arguments and tensions between the team members. Some of the employees are against and fear changes due to them losing their jobs or not being able to fulfil the responsibilities.

Meanwhile, when it came to the thoughts on the new strategies, some respondents had replied by saying that new strategies will require a lot of effort and time in order for the strategy to be learned. Some had mentioned that they are overloaded with work that learning a new technique is not something they look forward to. However, few of the employees mentioned that they don't mind spending their time in knowing.

CONCLUSION

This study concludes that a lot of the employees were aware of JIT concept. The owner believed that with time, the approaches and techniques that the company uses must be changed and developed in order to remain competitive and in the market. The managers had agreed that they can provide expertise and knowledge when it comes to JIT implementation and that they believe that there is a moderate and fair amount of effort in making sure JIT is properly used. Results for this study showed that storage problems had occurred and orders are conducted every 4 months. However, quantities of the raw materials of components that are needed for production are not fixed. Also, three quarters of the respondents of the employees would agree and be with a new strategy if it was to be implemented. Results had showed that the challenges that are faced when a new technique is to be implemented are first, not having a clear plan or an outline, having some of the employees disagreeing and not on board with the change, miscommunication, and fear of changes. Meanwhile, when it came to the thoughts on the new strategies, a lot of effort and time are needed and workers are overloaded with work that learning a new technique is not something they look forward to.

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