

Feasibility of Just-in-Time (JIT) in Ghana

¹David Ackah, & ²Emmanuel Ackah

¹Golden Sunbeam International College of Science & Technology, ²Kwame Nkrumah University of Science & Technology

Abstract

Just-in-Time, a system of production that calls for the elimination of inventory has taken many parts of the world by storm. Many producers and even suppliers are engaging the statutes of this new production system and are seen to be clearly reaping the benefits associated with it. Ghanaian firms seem to be tarrying with respect to the use of this system thus this paper seeks to discover how beneficial this system of production will be to producers in Ghana and how feasibly its implementation will be. In attaining the objectives of this study, both qualitative and quantitative data were collected with the main data source being Magvlyn Industries Limited. Published journals and articles were some of the other data sources used. A regression analyses served as the tool for the determination of the strength of the relationship between sales and inventory. Also a qualitative analysis was used in the analysis of the questionnaires and other secondary data collected. In conclusion, it was determined that there is a very strong relationship between inventory levels and sales and that inventory levels have a positive impact on sales. Also it was realized that Just-in-Time would not be the most feasible of production options for producers because of the current economic and infrastructural difficulties and also because of Ghanaians attitudes towards change.

Keyword: Feasibility Study, Just in Time, Economic Development

I. INTRODUCTION

The benefits of JIT are said to go beyond the advantages derived from the usage of the traditional manufacturing methods. JIT is a system that calls for a total change in every aspect of a firm's practices and equipments; inventory, management, machinery, skill level of workers etc (Brandon & Drtine 1997, pp. 518). These changes also include the creation of stronger relationships with suppliers (Brandon & Drtine 1997, pp. 518). Companies' whose business practices are an enactment of JIT postulates, may initially be seen as suffering the risks associated with ordering raw material only when needed, but these companies overtime draw on their supplier relationship and are thus always assured of cheaper, high quality and readily available raw material on time. Another advantage that companies stem to derive from practicing JIT methods is the ability to reduce their lead times (Weygandt et al., 1999). This is because of the relationship companies have with their suppliers and the layout of their machinery (production line) reduces the time that products spend within the production system. Majors costs associated with the traditional manufacturing systems are also eliminated when companies are involved in JIT. Whilst the streamlining of operations and production removes the extra cost associated with a traditional operation system, JIT also removes the attendant costs of inventory storage ((Weygandt et al. 1999, pp. 143).

Ghana, a developing country, has many manufacturing industries including; the food and beverages industries, mining sector, paper, plastics, clothing, and textiles industry. The activities of all these industries have been affected by international trends and occurrences due the opening up of the Ghanaian market to the rest of the world. How well do these domestic industries compete with their foreign competitors locally and internationally? If these Ghanaian industries are faced with costs that put them at a disadvantage with respect to price how will they survive in their own market? For example, the wax print manufacturing industry made up of companies like Akosombo Textile Limited and the Ghana Textiles Prints is faced with stiff competition from Chinese competitors who have flooded the Ghanaian market with cheaper products (Ryan, 2006). JIT offers producers the chance to reduce carrying costs and increase productivity thereby increasing profitability. Faced with an environment that is subject to the elements of a developing economy, Ghanaian companies are exposed to the disadvantages associated with an underdeveloped or developing economy; high levels of inflation, balance of trade problems. To rise out of the effects of such straits Ghanaian manufacturers have to do something extra to be efficient and successful in their local and the international markets.

Considering the benefits of JIT system, will the Ghanaian environment support the implementation and practice of JIT system of production? The goal of this study is to test the feasibility of Ghanaian manufacturing companies shifting from traditional manufacturing ideas to modern methods of business operations specifically, the JIT system keeping in mind the stated benefits of this system. It also seeks to discover the benefits or otherwise that Ghana as a whole might derive from the change. The research, therefore, seeks to access the feasibility of JIT system of production in developing countries, specifically, Ghana.

A. Problem Definition

Developing countries have shown good growth possibilities over the last few years with the implementation of policies and practices that will encourage growth and development in various sectors of their economy. For companies in these economies to be sustainable in this competitive business environment and to ensure economic growth and development, they must utilise modern systems business operations. However, it appears that most businesses in Ghana are still using the traditional system of business operations. The questions for which answers were sought through this study are; how do Ghanaian companies remain competitive with their old ways of operations? Can Ghanaian companies integrate modern systems of business processes (i.e. JIT) in their operations? Does Ghana have the right systems to support and develop JIT? For these questions to be answered there is the need for research into these subject areas hence, the motivation for this study.

II. LITERATURE REVIEW

The performance of JIT in other economies is evaluated through this review. The discussion of existing data better defines this research because it helps identify past achievements in this field of study and at the same time magnifies the gaps that are yet to be touched.

Although the JIT system of production can be described as one of the newest additions to the existing production practices, it has gained widespread recognition and use. Despite this widespread use of the JIT system across many industries all over the world, almost all literature on this subject cover fields that exclude developing nations.

A. Definition of JIT

By this definition, the JIT system of production is seen as a measure of control over inventory and time. This control over the variables time and inventory in the JIT system is the waste annihilating factor that businesses are set to derive performance and competitive benefits from. Also J. E. Beasley (n.d.) describes JIT as a lean production method that does not only eliminate waste in its many forms, but it encompasses the belief that ordering costs of companies can be reduced. Apart from these stated aims of this system, Beasley (n.d.) further describes it as the system that continuously pushes firms to improve.

B. Merits and Demerits of JIT

The inhibiting factors that may stop most firms from changing from the traditional methods of production to JIT are the costs or demerits that are likely to be experienced. Although these costs, huge initial startup costs, negative producer-supplier relationship and product quality issues, can easily cripple a firm's productivity the bad effects of the change are usually felt within in the early days of implementation.

C. JIT and the Traditional Method

Though the traditional method of production and JIT are all directed at producing enough to meet a market's demand in the most optimum of methods, these systems differ in the manner in which they arrive at this objective. While the traditional method is more inventories focused, JIT is concerned with the elimination of inventory and the changing of manufacturing systems into a more fluid and highly connected production system. Brandon and Drtine (1997) in *Management Accounting: Strategy and Control* describe JIT as having the theme of inventory being waste while the traditional method values inventory because it serves as an available stock for meeting increased (expected) demand

and also serves as a buffer for defective parts or products. This implies that JIT has firms keeping only necessary levels of inventory to meet present demand while the traditional method has companies keeping much higher levels of inventory to meet expected demand. Though the JIT method may suffer mishaps of late deliveries because of late supplies, the traditional method incurs higher costs because of storage and bears a higher risk especially when the goods are perishables, because the goods produced may never be purchased (Brandon, H. C. and Drtine, R. E). Brandon and Drtine also describe the traditionalists as manufacturers who derive better relationships with their suppliers through bulk purchases from which trade discounts may be negotiated. On the other hand, the JIT companies build relationships with suppliers through the negotiation of long-term contracts to hedge against price fluctuations and to ensure timely and high quality deliveries.

D. The Ghanaian Environment

The Ghanaian economy has undergone many different epochs of structural adjustment programs because it has suffered many financial and economic woes. The nation was and still is indebted to many creditor nations and organizations and suffers a perennial balance of trade problem (Aryeetey 2000). The political atmosphere was also riddled with a series of coups that also contributed to the economic problems of Ghana (Konadu-Agyemang 2001, pp. 444). Implementation of reforms in the financial and agricultural sectors was minimal or non-existent in the formative years of the countries independent economy (IMF n.d.). The International Monetary Fund in 1998 foresaw Ghana crossing the poverty line in thirty years if it maintained its current growth rate and methods (IMF n.d.). In addition, the liberalization of trade in Ghana has led to a gigantic increase in imports and trade deficits (Amoako-Gyampah 2001). This saw to the demobilization of certain manufacturing industries because they could not effectively compete with the foreign industries that had better production methods and systems than those of Ghanaian origin (Amoako-Gyampah 2001). Thus, Ghana at all levels of production depends on imported goods and machinery. Most final goods on the local market such as rice, matches, and shoes are imported. (Agyeman-Duah 2007) Most Ghanaian companies also depend on raw materials from foreign sources.

Though Ghana did not suffer the many of the untold woes that befell most developed countries with the inception of the global financial crises, its economy still showed signs of stalled growth as the general fall in demand in the developed countries narrowed the growth prospects of most Ghanaian companies. Some companies even lost their foreign and local market shares due to the fall in demand and the quest of companies established in developed countries to seek out new lucrative markets. The woes suffered by the Ghanaian economy due to the long reaching effects of the credit crunch was compounded by the ever rising oil prices in 2008, and the general uncertainty that came after the election of a new government in December 2008. In 2009, inflation and exchange rates were fluctuated with the nation witnessing some of the highest rates recorded in recent years. Africa is the least developed continent in the world; the infrastructure base of the continent is near deplorable, and Ghana finding itself on this continent has not escaped from the present fate of its host. The transportation and communication network in Ghana is scanty with a majority of this infrastructure located in the south of the country (Ghana Statistical Service, 2005). The distribution, of other growth determining resources like educational and health facilities is also skewed towards the south of Ghana. Though the infrastructural base of the country is weak, inroads in the form of free basic school education, free meals for primary students, the national health insurance, and the free maternal healthcare have been introduced to improve Ghana's resources and infrastructural base.

E. Ghana and JIT Today

In Amoako-Gyampah and Gargeya's research article on Just in Time Manufacturing in Ghana, the production processes of forty-eight companies were analyzed. Twenty-four of these companies were identified as JIT companies because they had identified the benefits of this manufacturing process and had implemented some of its statutes. These JIT Ghanaian firms, had made efforts at employee training, setup time reduction, supplier partnership and continuous quality improvement, though these Ghanaian firms do not boast of a total JIT influenced production system. One commonality between the Ghanaian JIT practitioners and non-practitioners is the lack of a difference between the existing measurement systems of these two groups. Inventory levels, inventory record accuracy, shop floor routing accuracy and raw material accuracy are some of the measurement areas in which both classes of Ghanaian firms

exhibit the same capacity. The presence of similar measurement abilities of both classes shows that Ghanaian companies may lack the ability to fully benefit from the advantages JIT offers because they may be miscalculating the variables they need to improve, reduce, or enhance. The improper management of JIT in practicing companies can lead to the inability of firms to properly predict demand levels as occurred in 1999, when Internet Corp. underestimated demand levels. The lapse in demand measurement saw Internet Corp. experiencing high labour turnover, and increased plant breakdown. This research also counters the disbelief in the capacity of manufacturing firms in developing countries to understand the essence of JIT.

F. Ghana and JIT: Future Prospects

The lack of extensive literature on the viability or nature of JIT system of production in developing countries especially Ghana, shows the need for more research developments in that field. Most developing countries especially African, complain about the negative impact trade liberalization has had on the local manufacturing industries. Can JIT be the change causing factor that prepares local industries more for the overwhelming impact of foreign industries? However, in answering this question one first has to confirm the feasibility and viability of a total JIT system in developing nations. As shown in the examined literature, the requirements of this new system are just not infrastructural based, but changes in human attitudes and skill level are needed. Even when infrastructure is solely considered, the success of JIT is dependent on both internal and external infrastructure. Internal being the firm's own facilities and plants and external is concerned with those facilities and systems that the state and other stakeholders provide to support the activities of local firms. From this review, it is realized that Ghana outwardly may not be a feasibly ground for the implementation of JIT. This is due to the weak external infrastructural base, price fluctuations or inflation caused by global oil hikes, exchange rate risk, and general market perceptions. The lack of proper facilities in the form of education and healthcare will also impede the production and sustenance of labour with the proper skill sets to manage the complex JIT vision. Amoako-Gyampah and Gargeya's research on the other hand point out that there are some existing Ghanaian companies practising variants of JIT. This study will thus be centred on discovering reasons that will confirm the feasibility or otherwise of JIT in Ghana considering both the internal and external platforms that encourage or disallow it.

III. METHODOLOGY

In the quest to discover whether Ghana possesses the proper environment to support the statutes and practices of JIT, there is the need to find suitable data which upon analysis will inform whatever conclusions and recommendations that are made. This study focuses on the manufacturing industry of Ghana, but uses Magvlyn Ind. Limited as the platform for analysis because as reiterated in earlier chapters, this thesis seeks to discover how changes in the operations of the many small to medium production enterprises can affect economic growth, although this is not the underlying reason for the carrying out of this research.

The previous chapter served as a platform for discussing and reviewing existing literary works on the Ghanaian environment and JIT. It also looked at how both will relate together. This chapter moves a step further by showing the ways in which the relevant data and its collection was carried.

This research process; data collection and analysis, sought to show the correlation between the Ghanaian economy, manufacturing firms and JIT, through the answering of the following questions:

- How the state of Ghana's economy will affect the survival of JIT?
- How the current practices of manufacturing firms and their asset base will support a JIT Platform?

A. Research Methodology

Although the data collected was mainly primary, secondary data was also used. Questionnaires were used primarily in the collection of data from the selected company. The respondents to the issued questionnaires were staff of Magvlyn Ind Limited in both management and subordinated positions, to ensure accuracy of data. The secondary data collected from Magvlyn Ind. Limited spanned a period of five years; from 1st January 2005 to 31st December 2009 and

is information on their sales revenue and inventory operations. Other secondary data sources were published articles on the economy, development, infrastructure, and the societal receptiveness to change of Ghana.

B. Selection of Company

The primary data source Magvlyn Ind. Limited, was chosen on a convenient basis owing to the limitation of time. Other primary data sources considered were the Tema Oil Refinery, Blue Skies Ghana, and Nestle Ghana Ltd. These were dropped because the refinery was gutted by fire and the streams of processes that had to be undergone to get permission at Nestle and Blue Skies pushed against the boundary of time.

C. Sampling Method

Since each staff member of Magvlyn Ind. Limited is randomly distributed with respect to duties and tasks, systematic sampling was used for the lower level employees. Convenient sampling was used in the collection of data from managers since some managers were more directly involved with JIT (and traditional method) implementation and functions than others. This convenient sampling on the part of managers was done to control the information received and to ensure relevance.

D. Population and Sample Size

Fifty respondents were chosen because Magvlyn Ind. Limited is a medium scale manufacturer and as reiterated the constraint of time would not allow the consideration of a large sample size. JIT involves all aspects of the firm thus a sample size of forty-five respondents were selected from the employee pool on a systematic basis to ensure that the data is not skewed. Five members of management were also chosen on a convenient basis depending on their positions and how their duties may be directly affected by JIT. Due to the sampling method used, each employee (especially from the lower level) had an equal chance of being chosen and that the most relevant information was collected.

IV. CONCLUSION

This chapter is a presentation of the conclusions drawn from the analysis made in the previous chapter. JIT is a production system that is mainly characterised by the removal of inventory from production processes. This system calls for certain changes in operations and internal culture like the restructuring of production floors, retraining of workers, new and increased worker responsibilities.

JIT has several benefits that can enhance a firm's production cycle. JIT can also generate costs or setbacks especially if ill applied. Some of the benefits of JIT include high quality and cheaper goods, reduction in waste levels and increased supplier relationship. The demerits also comprise of a possible halts in production during times of natural disasters, the risk of delayed products to consumers due to defective parts and the cost of paying salaries and wages during periods of low or no production.

Though several articles have been written on this system, very few exist on the system in developing countries (especially Ghana). The only article on Just-in-Time in Ghana by Amoako-Gyampah and Gargeya (2001) uncovered that, variants of the JIT system is what most Ghanaian companies are practicing. Other articles highlighted some of the necessary tools or elements for a good JIT implementation as, a good infrastructure, good supplier relationship, and a vibrant and dynamic economy.

A. Findings

A regression analysis was carried out to show if there was a relationship between sales and inventory costs. From Table 9, there was an R^2 value of 98%, implying that there is a strong relationship between sales and inventory. Also this means that 98% of the variation in sales can be explained by the regression model. The positive p-value of 0.00167 (less than 0.05) means that the value obtained for the slope is significant thereby confirming the relationship between sales and inventory. This analysis shows that inventory has a strong and positive influence on sales.

From the sampled elements there seems to be an existing knowledge of JIT within the upper management and the junior workers in the positions of supervisors and operation assistants. The knowledge of JIT also affected the manner in which the workers viewed their operational activities, where seventy-five percent of the workers who had no JIT knowledge saw their activities as purely traditional and as did fifteen percent who had some JIT knowledge. Only five percent of the workers who were mostly based in the pure water division that kept no finished goods inventory saw any JIT practices in their operations.

Most of Magvlyn's workers were willing to change their operational activities because they were just in the business of producing for their employers so they can also earn an income. Only twenty-seven percent of the people who were willing to accept a change attributed their desire to the need for a more efficient production system. According to other published data analysed, Ghanaians are generally not willing to accept change due to traditional teachings, society's value placement system and the cost the change may bring.

Some other elements like the perception the employees have of the strength of supplier relationship was seen too high as seventy percent of the respondents said that their company had a strong relationship with its suppliers. Most of the respondents stated that there was generally a good relationship between workers of all spheres. There is a consensus that all workers can easily report problems and air their views on certain production practices to high-ranking staff members and management. Magvlyn on the other hand does not have a well-grounded training system for its staff as most of the employees are trained as and when they are employed and receive no other form of training.

With respect to infrastructure most of the workers concur that the general Ghanaian infrastructural base has an adverse effect on their production. The data collated and analysed on the educational, health, transportation and communication facilities show that the nation's current infrastructural level hampers production. Ghana's infrastructural base hampers the distribution and receipt of goods to consumers and from suppliers respectively. The nature of Ghana's infrastructure also affects the productivity of workers since the human resource products of this system are of under educated and trained. There is also the factor of low productivity due to ill health rising out of the nation's inability to increase the capacity and number of health facilities. The economy is also seen to have a neutral influence on the operations of Magvlyn by the sampled elements since all costs will be passed on to the final consumer. Twenty-five percent saw the economy as having a negative effect on operations. The economic indicators like inflation, Treasury bill rate, interbank exchange rate and the cedi to dollar rate in 2009 showed that the economy declined. Most of the indicators increased in values showing that the costs of loans and operations had increased. The fall in the Treasury bill rate showed a drop in the return on investments.

B. Conclusions

The research showed that there is a strong relationship between inventory and sales implying that companies will be less willing to scrap inventory, because of its incremental and positive ties with sales. The economic situation in the country has led to the unpredictability of demand and supply. According Nanor (2009), fuel price increases for instance have a positive effect on the general price levels in the country. As a result, any increases in fuel prices lead to a fall in demand.

JIT is demand based and any incessant and frequent falls will hamper the smooth running of the system. Though the studied company has some practices that will support JIT introduction and implementation, the current economic situation in Ghana will not support a full JIT system. JIT thrives on a good infrastructural system, which Ghana clearly lacks. There are inadequate and ill-maintained transportation and communication lines, health facilities, educational institutions and the providers of utilities like power and water are infrequent with their deliveries. Lastly, Ghanaians are shown to be negatively correlated to change and JIT asks for a total overhaul of existing production systems.

C. Recommendations

For JIT to be feasible in Ghana there needs to be an upgrade of Ghana's infrastructural assets. There needs to be more of everything; schools, hospitals, power lines, water pipes and roads. Infrastructure helps generate income to grow and develop an economy. Hence, a good infrastructural base will help fix the current economic problems of Ghana. The culture of maintenance also needs to be adopted, maintained and upheld by all Ghanaians.

Companies who hope to change into a JIT system must improve upon their internal culture of training, employee contribution, and suggestions. This does not only hold true for a JIT system since internal operations of traditionally producing companies will be heavily enhanced when this is implemented.

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