

Empirically Validating JIT: Case Of A Business Organization In Bahrain

Saad Darwish, Zorah Abu Kassim, Isa Sharif Mohammed Abdulla

Abstract : This study empirically validated J.I.T. principles, specifically ineffective stock control management in a business organization in Bahrain. The methodology employed is descriptive statistics, Pearson Correlations and Multiple Regression. One hundred one employees of Ashraf's W.L.L. Company participated by a questionnaire survey. Findings indicate a positive relationship between supplier relationship, management attitude and employee approval and J.I.T. practice inefficient stock keeping. However, there was a negative relationship between work distribution and stock control and J.I.T. practice of stock-keeping while the time factor is insignificant. Managerial implications are; management attitude and support essential; good supplier relationship plays an integral role. Thus, communication vital, and employees need to be empowered. H.R., therefore, plays a strategic role in organizations. Limitations of study; small sample size and no interactive effects examined. Further studies; other factors could be considered such as zero defects, quality control.

Keywords: J.I.T., Case Study, Supply Chain Management

1. INTRODUCTION:

Just-In-Time (J.I.T.) refers to an inventory management method whereby inventory is readily available to meet demand, avoiding excess quantities (Chen & Sarker, 2010). This approach helps companies hold minimal inventory while ensuring that stock-outs do not happen, especially during peak selling periods. At the heart of J.I.T. is a balance of avoiding stock-outs while reducing stocks costs. Today, retail outlets are selling on multiple channels and supplying products to customers by various methods, such as buying online, picking up products in-store, and shipping directly to the users, such as Amazon. This scenario reduces inventory visibility which can impact retailers, suppliers, and consumers alike. J.I.T. programs emphasize the importance of having an effective product management system in place to improve business decisions and experience business growth (Brown & Mitchell, 1991). Thus, Business organizations that do not have good stock management processes in place often suffer from inefficient operations, fewer satisfied customers, and stock issues. Inventory management requires Time and money to improve business operations. A retailer may consider implementing a J.I.T. program as a time-saving and inventory management method. Therefore, a retailer needs to thoughtfully consider both the advantages and disadvantages of J.I.T. programs (S.P.S., 2017).

1.1 Company's Brief Description and Problem Statement

This study focuses on Ashraf W.L.L Company operating in Bahrain. The company was established in 1913. The company initially started humbly from a small shop in the souk at Manama to become one of the largest retailers of world-renowned brands of 1.2 million (B.D.) sales turnovers with 300 employees. The company has four core business divisions; Electronics, Photography, Fast Moving Consumer Goods (FMCG), and Giftware. The company has an extensive network of retail outlets in Bahrain with the head office in Hoora and Warehousing facilities in Maamer, Sitra. Currently, the Ashraf's group of companies are Ashrafs W.L.L., Ashraf's Distributors, Ashraf's BGDC, and Gulf Color Laboratories (Ashrafsbahrain.com/about-us, n.d, 2020).

The traditional inventory systems enable companies to buy a large amount of inventory when they do not have space or do not require such an item, and sometimes the items get expired or obsolete. They throw it as scrape items; the traditional inventory system also requires workers to handle almost all shipments at least twice. It will lead to a double job and Time consuming, at the loading dock and the assembly line, on worker-hours spent moving inventory would be considered wasted resources (Orchestra, 2015). The company attempts to implement a J.I.T. system without confirming that the other lean manufacturing components are in place. Implementation of J.I.T. reduces costs and increases productivity, but there is a loss of flexibility and security that many smaller companies cannot afford. Also, many unhappy customers will not complain but will not do business again, and they disappear. Consequently, negative word-of-mouth by ex-customers will also be another adverse result (Hollingsworth, 2018).

2. Definitions and Origins of J.I.T.

Just in time philosophy is "manufacturing based on a management plan that identifies then eliminates all waste that emphasizes continuous improvement in plant productivity". Hence, J.I.T. philosophy comprises activities aiming to reduce cost by eliminating waste (Al-Haraisa, 2017; Gyampah & Gargeya, 2001; Chakravorty and Avatar, 1995; Cobb, 1991; Fullerton &

- Professor Saad Darwish is a Professor of Management at Kingdom University, Bahrain, PH-+97339777005. E-mail: saad.darwish@ku.edu.bh
- Associate Professor Zorah Abu Kassim, Program Coordinator of MBA, Faculty of Business, Arab Open University, Bahrain, PH-+97317407545. E-mail: zorah.kassim@aou.org.bh
- Isa Sharif Mohammed Abdulla, Faculty of Business, Arab Open University, Bahrain, PH-+97337773647. E-mail: issasharif@hotmail.com

McWaters, 2002). J.I.T. as a concept and philosophy started initially in the Japanese auto industry (Aghazadeh, 2003; Matsui, 2007). A well-known example of J.I.T. implementation is the Toyota Corporation of Japan. One of the two pillars of Toyota Production is types of waste-overproduction such as waiting or transportation invalid motions, idle Time, inventory, ineffective processing, or product defects and waste because waste does not add value to the customers. All activities of J.I.T. production are deployed around waste reduction. Since the 1980s, J.I.T. literature has been prolific in research with many empirical studies conducted (Tan, 2013; Biggart&Gargeyam 2002).

2.1 Benefits of Implementing J.I.T.

There are several benefits for implementing J.I.T. One benefit is decreased inventory costs by reducing inventory, resulting in decreased labor or storage expenses before storing or managing stocks (Boute et al., 2008). Thus, extra warehouse space can be used for other businesses and activities. By carrying minimum inventory, retailers can lessen the amount of old stock that needs to be marked down. These resources can be reallocated to pursuing growth-oriented opportunities, for example, to expand production online (S.P.S., 2017). Therefore, supply chain management or J.I.T. as a process can be improved by understanding environmental elements such as global issues, competitive rivalry, rate of technology, or developing new or upgrading of core competencies. Furthermore, firms who implement J.I.T. tend to improve their employees' understanding by engaging employees as learning teams because of the strategic importance placed on personnel in the organization. Staff development factors such as changing business culture, improving functional communication, or improving employee morale through empowerment and training are a priority. J.I.T. firms are more reliable as these firms have the advantage of product reliability or fast delivery, fast design changes, or product customization. Product reliability as the top priority indicates that managers of J.I.T. companies believe in the importance of quality as an essential element of competitive advantage. Fast delivery and product customization make such companies have time-based flexibility and, thus, be highly competitive. However, product quality and price as competitive priorities are ranked relatively low in terms of priority. Unlike traditional companies, managers from J.I.T. firms believe that perceived quality and value pricing is no longer the primary elements of competitive advantage. For efficient execution of J.I.T. requires a detailed understanding of organizational strategy and placement approach through sub-strategies in the company. Control systems need to be coupled with a responsible and automated manufacturing system; this can be measured as a competitive asset to create a streamlined manufacturing organization. However, machines and equipment do break down during production continuously, even with accurate schedules. Therefore, remedial actions have to be considered. Often after a disruption in manufacturing, a pre-planned schedule can become irrelevant. Therefore, the programs chosen need to be dynamic to align with a manufacturing environment.

(Özbayrak, 2006) In addition, the adoption of J.I.T. can simplify a pull production process. Recent studies have shown that J.I.T. can promote efficient or flexible productive resources, decreasing throughput times. J.I.T. increases production or service quality by increasing productivity, thus enhancing three main pillars: waste elimination, efficient workplace organization, and improves employee involvement. The achievement of these results requires shorter setup times, he also on the education or training of managers who develop plans and of workers who will execute these plans (David, 2014; Zhu & Meredith, 1995). To gather short preparation times requires highly trained and skilled working personnel. Standardization is one of the essential elements required for the successful execution of J.I.T. By applying the concept of standardization, easy availability and interchangeability of tools and parts are ensured, making the processes simple.

Therefore, statistical process control plays a role to explain the success of any J.I.T. program. Statistical process controls the process through performance indices and is equally important in all phases and departments of a company or industry. Appropriate quality control plans and programs with their application by statistical quality control are crucial for J.I.T. implementation. Total quality control as a J.I.T. element for maintenance includes selecting the right person for the suitable maintenance activity, education and training of maintenance personnel, equipping the maintenance team with special and updated tools and techniques, considering the feedback of maintenance personnel, encourage computer-assisted maintenance management system and the need to work for error prevention instead of error detection. Furthermore, quality certification of suppliers helps the selection of suppliers for future use. Vendor rating identifies the best vendors and initiates healthy competition among vendors to supply quality items & service at the best prices. Also, implementation of J.I.T. requires regular quality auditing to help improve quality weaknesses and strengths in the system. Zero defect targets improve quality because 100% quality inspection ensures no rejection and no customer complaints. When there is uninterrupted workflow, this will increase the accessibility of the machines and the system.

2.2 Dell Corporation; A case study in J.I.T.

Dell Corporation has had outstanding revenue achievements by resorting to its innovative business model and a highly efficient supply chain management system. Dell has a J.I.T. manufacturing model that Toyota Motor Corporation executed in the 1960s. Dell emphasized just-wanted accessories, only at the required quantities and just-in-time needed for manufacturing and distribution channels. Different from regular distribution channels, the direct business methods of Dell resulted in prompt response to customers. Once the order of the clients cannot get an immediate response, it means that some links in the supply chain management will have issues, and Dell has to create adjustments (Monden, 2012). Dell has an information platform that has an in-built system to make for dynamic adjustments if need be. Dell can deliver the order

information to the upstream accessory manufacturers efficiently and promptly through the information platform. Thus, manufacturing can produce and assemble the fittings dully to the electronic order and provide the goods according to the timetable, with no supply chain bottlenecks as the information platform can trace any issues that might arise. Thus, the success of the Dell model can be attributed to the interaction of the direct business methods and supply chain management system enabling rapid response to customers (Hanlon, 2007).

3. Objective of the study

This study aims to determine the relationship between factors such as; employees for approval and keeping, work distribution, the time factor, management attitude, supplier relationship and stock control, and J.I.T. practices of efficient stock-keeping.

3.1 Significance of the Study

Just in Time practices could improve firm performance by improving lead time, have cost-savings and flexibility while reducing stocks level (Bala, 2012). Therefore, the findings of this study could give insights to managers of organizations on improving their stock inventory strategies as a method of reducing cost by eliminating waste. Managers of organizations will be interested to know how actual J.I.T. practices can lead to cost reduction and effects on employees in terms of employee engagement and empowerment. Managers of organizations could be top managers, production/product managers and H.R. managers. This study re-affirms other studies done but in the context of one company operating in Bahrain.

3.2 Scope of the Study

The study investigates the relationship between factors affecting J.I.T. practice inefficient stock-keeping by using a questionnaire survey distributed to all employees of Ashraf W.L.L Company.

4. METHODOLOGY

4.1 Hypothesis

The following research hypotheses are as follows;

- H1: There is a positive relationship between employees for approval and J.I.T. practices of efficient stock-keeping
- H2: There is a positive relationship between work distribution and J.I.T. practices of efficient stock-keeping
- H3: There is a positive relationship between time factor and J.I.T. practices of efficient stock-keeping
- H4: There is a positive relationship between Management Attitude and J.I.T. practices of efficient stock-keeping.
- H5: There is a positive relationship between Supplier Relationships and J.I.T. practices of efficient stock-keeping.
- H6: There is a positive relationship between Stock Control and J.I.T. practices of efficient stock-keeping.

4.2 Conceptual Framework

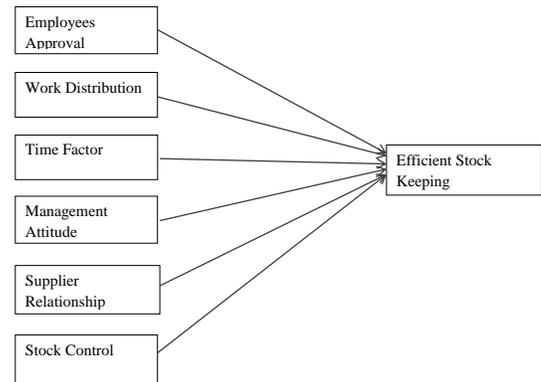


Figure 1: Conceptual Framework

4.3 Framework for Data Analysis This study shows how J.I.T. applied in Ashraf's; snowball sampling was used, the survey was sent to 110 non-randomly selected employees in Ashraf's and of different private organizations in Bahrain, despite their origins and nationalities to complete and asked to send the same to their friends and contacts, Total respondents received were 101. The study includes a large number of respondents concerning the psychosocial work environment. Static analysis of quantitative was developed based on structured questionnaires. Sixteen questions about Information on J.I.T. on employees approve the system or not, then work distribution, the time factor, management attitude, and supplier relationship. These scales were developed by using factor analyses and analyses of internal reliability in the previous study. The web-based survey was used because it is easier to manage the data manipulation and analysis after the survey is completed, it is more convenient to share among the responders, and it is lower cost in terms of paper printing and Time to distribute and collect the questionnaire. The respondents asked to complete the survey in two weeks; a reminder sent to them after one week to ensure a higher response rate

5. Findings

A Pearson Correlation Analysis was conducted to explore the correlation relationship by showing the strength and directionality between the dependent variable (J.I.T. practices of efficient stock) and the six other variables; employee approval, work distribution, time factor, management attitude, supplier relationship and stock control. From table 1 shows that there is a significant relationship between J.I.T. practices of efficient stock to all dimensions; employee approval, work distribution, the time factor, management attitude, supplier relationship, and stock control at a significant level of 0.01 ($p < 0.01$) or significance level of 0.05 ($p < 0.05$) and direction of the relationship is positive.

Table 1: Pearson Correlation Analysis

Item			JIT Practice
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			Efficient Stock Keeping (Total)		
1-The employees approve the application of the JIT system.?	1.00	0.883*	0.975**		
6- I agree with applying the inventory operating system.	0.883	1.00			
2-The work is distributed fairly with JIT practice.	1.00	0.892*	0.988**		
15-The employee withholds information from the management about work.	0.892	1.00			
3-Are conflicts resolved in a fair way when there are shortages in stocks?	1.00	0.888*	0.984**		
4-The employees are able to finish the work on time with JIT practice.	0.888	1.00			
7- Management trust the employees to do their job well in purchasing.	1.00	0.888*	0.897**	0.786**	0.978**
10- Suggestions from employees are treated seriously	0.879*	1.00	0.910**	0.836**	

by the management.					
13-Store keepers manage stock inefficiently	0.897*	0.910*	1.00	0.853**	
14-You are a part of the ordering community.	0.786*	0.836*	0.853**	1.00	
8-There is a trust relationship with suppliers for the company to rely on goods being there when they are needed.	1.00	0.873*	0.863**	0.987**	
11- Help and support are rendered by your supplier.	0.873*	1.00	0.882**		
12- Your regular supplier often fulfills your JIT.	0.863*	0.882*	1.00		
5-The shop floor layout facilitates inventory.	1.00	0.821*	0.898**	0.986**	
9-The storekeeper is trained enough.	0.821*	1.00	0.860**		
16- Storekeepers make complaints due to their incompetence.	0.863*	0.860*	1.00		

**Correlation is significant at the 0.01 level (2 tailed)

* Correlation is significant at the 0.05 level (2 tailed)

A regression analysis was done, as Table 2. The regression shows a significant relationship between the dependent variable (J.I.T. Practices of efficient stock) and independent variables have with an R-coefficient of

0.965. The regression table shows that R^2 is 93.2 % of the total variation, which means that the six dependent variables explain J.I.T. practices of efficient stock keeping. The findings indicate that variables such as employee approval, work distribution, management attitude, supplier relationship and stock control at a significant level of 0.01 ($p < 0.01$) or significance level of 0.05 ($p < 0.05$). In the regression table, too, the supplier relationship with the highest predictive beta ($\beta = 0.906$) is positively significant with J.I.T. practices of efficient stock ($p < 0.01$). Therefore, H5 is supported. This is followed by management attitude with a predictive beta ($\beta = 0.529$) with J.I.T. practices of efficient stock ($p < 0.01$). Therefore, H4 is supported. Employee approval had a predictive beta ($\beta = 0.243$) with J.I.T. practices of efficient stock ($p < 0.01$). Therefore, H1 is supported. The work distribution variable has a negative predictive beta ($\beta = -0.408$), indicating a negative relationship between work distribution and J.I.T. practices of efficient stock. Hence, H2 is not supported. From the regression table, stock control has a negative predictive beta ($\beta = -0.301$) to indicate a negative relationship between stock control and J.I.T. practice of efficient stock. Hence, H6 is not supported. However, the independent variable of the Time Factor was not significant with the dependent variable of J.I.T. practice of efficient stock. Hence, H3 is not supported.

Table 2: ANOVA Results

Model	R-Coefficient	R Square		Adjusted R Square	Std. An error of the Estimate
1	0.965	0.932		0.928	0.235
Source	Sum of Squares	df	Mean Square	F-Value	P-Value
Regression	71.564	6	11.927	215.265	0.000
Residual	5.208	94	0.055		
Total	76.772	100			

Model	Unstandardized Coefficients	Standardized Coefficients	t	P-Value	
	B	Std. Error	Beta		
(Constant)	-0.732	0.200		-3.663	0.000
Employee Approval	0.240	0.106	0.243	2.259	0.026
Distribute	-0.344	0.125	-0.408	-2.761	0.007
Time Factor	-0.006	0.119	-0.006	-0.046	0.963
Mngt.	0.594	0.145	0.529	4.101	0.000

Supplier relation[0.849	0.136	0.906	6.244	0.000
Stock control	-0.280	0.138	-0.301	-2.032	0.045

6.DISCUSSION AND IMPLICATIONS

Findings indicate that supplier relationship is of paramount importance to efficient stock keeping ($\beta = 0.906$). Literature confirms that the success of implementing J.I.T. effectively lies in the communication to suppliers. If there is little communication between the chain of suppliers and manufacturer, the probability of success for effective J.I.T. implementation will not be high. In an automation system, if materials are required, the supplier will receive an electronic message to deliver. This improves efficiency and reduces time wastage. The findings also indicate that management attitude is important to the success of J.I.T. Management, especially top management assurance and support (Chandra & Kodali, 1998). is the soul in an inventory system which is again the primary element of J.I.T. Also, the management and employees must have on their mind that this practice can help the organization solve many logistics problems. The implementation and development of J.I.T. is indeed a long-lasting and expensive process, but if the company can manage these difficulties, it is possible to achieve high levels of workflow. Furthermore, a managerial implication of this study proposes that findings go beyond inventory reduction and for frequent deliveries. Since the effective implementation of J.I.T. values requires a thorough understanding of organizational strategy and arrangement of the approach into sub-strategies, compared with the traditional institution, J.I.T. companies have a better understanding of utilizing performance measures at various levels of organizational strategy. This further implies that J.I.T. practices need to be aligned with organizational strategy. Since employee approval is significant in implementing J.I.T., this implies that J.I.T. requires a high level of involvement from employees. Employees need to understand and embrace the concept and philosophy behind J.I.T. in order for J.I.T. practices to be successful (García-Alcaraz et al., 2015). Although companies take care of regular orders and avoid overstocking, practicing the J.I.T. system can lead to a better stock process. Employees or designated stock keepers need to take ownership as they need to understand that nothing goes to waste and that they control the process there is no cushion or margin of error to fall back on. All stock keepers, tools, and methods work with one purpose, gaining and keeping customers happy. Anyone not contributing to that goal should not be retained in the company. Just in Time is a philosophy that aims to focus on eliminating waste from all production and business processes. It can be linked with lean manufacturing in terms of a mixture of J.I.T. and TQM. J.I.T. is a philosophy and not simply a case of delivering products exactly when they are needed. The main focus of J.I.T. is on the elimination of the different types of waste (Rao et al., 2013); first on stock, the second on the movement of materials, third on added value activity such as reducing set up times, fourth unnecessary processing, fifth space reduction (Hay, 1991). J.I.T. can be used as a continuous improvement activity. Therefore, employees

need to embrace this wholeheartedly. The supplier completes manufacturing of their product in Time to ship to the customer, therefore incurring no storage costs at all, the role of a 'stockiest' in the case of stock-less inventory (Sadhvani et al., 1985; Kim et al., 1988; Hay, 1991; Norris et al., 1994; Howton et al., 2000; Fullerton et al., 2003). The findings also indicate that efficient stock-keeping has a negative relationship with work distribution. This implies that implementing this practice could mean that work distribution could be disrupted as teamwork is necessary. From the findings, stock control also shows a negative relationship with the J.I.T. practice of stock-keeping, which implies that stock keeping is efficiently done according to J.I.T., then stock control as a function would be deemed superfluous in this context.

7. LIMITATIONS OF THE STUDY

The study has a few limitations that will affect the validity of the findings. Firstly, the small sample size of respondents (n=101). This is because respondents were employees of the Ashraf W.L.L Company. Secondly, this study scrutinized only one aspect of J.I.T. practice of efficient stock keeping. Other practices of J.I.T., which are equally important such as waste management, zero defects and quality control practices, were not investigated. The sample size is small. Therefore, this has a significant limitation of non-generalizability of findings. Fifthly, this study framework only focused on direct linear relationships with no interactive effects examined.

8. FURTHER STUDIES

Several recommendations for further studies are suggested. One recommendation is to have a larger sample size. It would mean an extensive data collection distribution to all employees of Ashraf W.L.L Company. Data collection should also extend to other employees in the same industry to those companies who are currently implementing J.I.T. practices and those companies who intend to implement J.I.T. practices in the future. This study can also be extended to other companies in other industries. It is recommended that private organizations (aka profit-making business organizations) and public organizations, as J.I.T. practices, embodies the concept of efficiency in operations that should not only be confined to manufacturing operations. Another recommendation is to comparative studies. This study focuses only on one company in Bahrain. Therefore, there can be scope to compare industries in different countries, for example, in the G.C.C. countries. Finally, other aspects of J.I.T. practices could be included in the study, besides efficient stock-keeping such as efficient information systems, warehousing control, quality control practices and automation, to name a few. In conclusion, this study is exposed to empirically validating one aspect of J.I.T. practices: efficient stock-keeping in one company operating in Bahrain.

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