

Impacts of low productivity in apparel value chain

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Abstract

Labor cost in apparel manufacturing industry is relatively low and it is the second largest garment exporter country in the world though manpower's value & education is very poor here. Productivity is also very poor here rather than other countries. Resulting in, it is very tough to keep customers commitment as well as gaining their confidence. But in view of few points, we are happy to improve our productivity gradually like other countries. This paper also shows few ways that how can improve garments productivity day by day by using different IE tools like line balancing, method study, proper supply chain, and motivation. Improving productivity can not only improve factory's FOB value but also this can improve our country's yearly income.

Keywords

Productivity, Efficiency, FOB, Line Balancing, Shipment, and SCM.

1. Introduction

Productivity is the crucial parameters in any manufacturing organizations. But low productivity severely impact on time shipment and which diminish the supply chain performance. Productivity always refers to speed. It is conceived of how speedily a product or services of desired quality is produced. Productivity is thus defined as a rate of production per unit of time or per unit of qualified worker or per unit of faultless machine. It is a measure of how much output is generated from a certain amount of input or resources. It is thus a ratio of output and input expressed in percentage (Khaled, 2008). However such a philosophy can be self defeating if it leads to unwillingness to cooperate in order to compete. Behind this seemingly paradoxical concept is the idea is the supply chain integration (M. Christopher, 2006-2007). Lin *et al's* survey, statistically proves that productivity is directly proportional to production volume and is inversely proportional to the frequently of style change (Lin *et al's*, 2002). Frederick Winslow Taylor introduced piecework in the factory. Taylor aimed to find the most efficient way of doing a specific task. He closely studied how work was done and would then measure the quantity produced (Kanigel Robert, 1996). A supply chain is the process of moving goods from the customer order through the raw materials stage, supply, production, and distribution of products to the customer (SCM, KPI, 2006).

1.1 Problems related to low productivity

- * Earlier lines weren't balance fully.
- * Poor technical knowledge of workers.
- * Required more changeover time.
- * Poor supply chain management.
- * More M/C breakdown due to no implement TPM/ machine management.
- * Required more time to achieve AQL.
- * Don't monitor hourly production.
- * Absenteeism / Migration rate was high.
- * No skill matrix is implemented.

- * No workers' training system.
- * No product /style wise line / floor selection.

Table 1. Effects of low productivity on efficiency and FOB

Month	Production (Pcs)	Efficiency (%)	FOB (\$)
January '17	519945	41.5	5098403
Feb' 17	580593	41.87	4090592
March' 17	534159	43.44	3729931
April' 17	533561	44.88	3491747
May' 17	430645	44.45	2819876

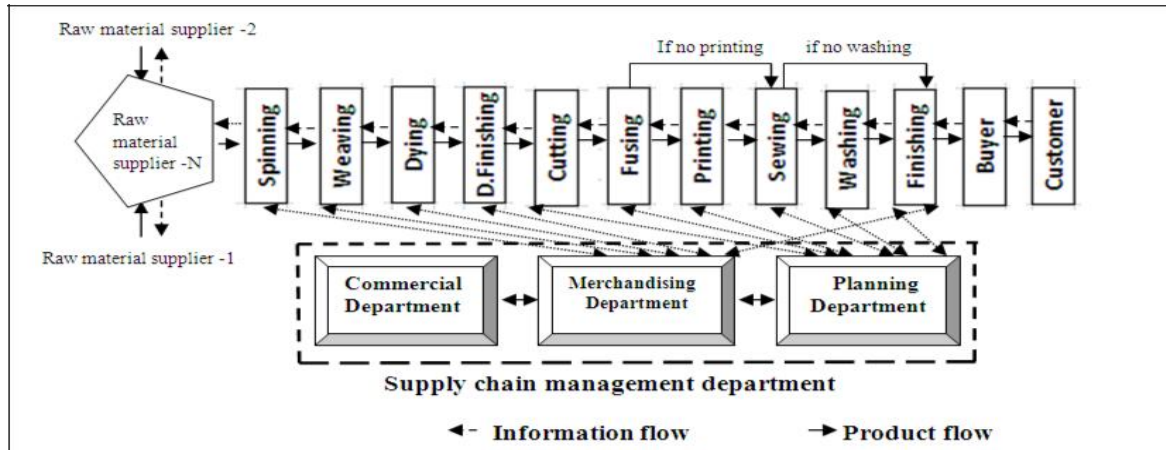


Figure 1. Apparel Value Chain

Table 2. Value Chain tracking

Month	Cutting (pieces)	Sewing (pieces)	Finishing (pieces)	Packaging (pieces)	Shipment (pieces)	TTL Sewing Line-Hour	Avg. Productivity per hour (pieces /hour)	Efficiency
January '17	542025	519945	505220	502950	502750	11554	45	41.5%
Feb' 17	571450	580593	592140	590770	590100	12788	45.4	41.87
March' 17	541032	534159	520510	519440	519320	11340	47.1	43.44
April' 17	512080	533561	531505	532050	531150	11162	47.8	44.08
May' 17	425870	430645	450400	445660	444990	8935	48.2	44.45
June' 17	387355	330909	325025	325870	322950	6358	52.05	48

2. Literature Review on SCM

Various researchers has been figured out SCM . This is not astonishing that there has been much debate as to a specific SCM definition as per on the relatively recent development of the supply chain journalism. SCM as a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers (Ganeshan and Harrison). Lee & Corey demonstrated that SCM consists of the integration activities taking place among a network of facilities that procure raw material, transform them into intermediate goods and then final products, & deliver products to customers through a distribution system.

The supply chain as the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer defined by Christopher. SCM is the "strategic and systematic coordination of the traditional business functions and the tactics across these business functions within a particular firm and across businesses within a supply chain, for the purposes of improving the long term performance of the individual companies and the supply chain as a whole mentioned by Mentzer J. T.

Trkman P stated that while the separation of supply chain activities among different companies enables specialization and economies of scale, there are many important issues and problems that need to be resolved for successful supply chain operation this is the main purpose of SCM.

“Supply Chain Management” was revealed in the late 1980s, and then it was exposed to all in 1990s by Hugos, M . Fredendall, L., D., avowed that before of that time „Supply Chain Management was used as different terms like- “logistics” and “operations management” in the business fields. Once up on a time, supply chain management was considered just like a concept. Implementation of this concept was very difficult as there were some necessary components in the total chain to connect with each other. The focal part of the barrier to full supply chain management was the cost of communication and coordination among the many independent suppliers in each supply chain. An entire supply chain covers the area from the creation of raw materials to the delivery of the finished consumer goods. So, many supply chains are involved in the entire supply chain of a product up to the ultimate delivery stage. This is why; it was difficult to link up actively all the supply chain points considered .

3. Proposed Method to improve productivity

Line Balancing (LB):

After starting production at any line, within 2/3 days we have taken cycle times for all processes/workers to calculate actual capacity. Here capacity of all workers isn't equal; that's why efficiency is also lower. To improve this efficiency, we have tried to distribute all tasks equally within all workers. By proper line balancing, we can improve 30% to 40% efficiency from existing efficiency.

Method Study :

After doing line balancing, few processes are found which are required more time rather than basic pitch time. To reduce these operation time, we have tried to analyze these by using different tools like motion study, reduce unnecessary movement, reduce unnecessary process etc. By method study we can improve 10% to 15% efficiency from existing efficiency.

IE based Layout Implementation :

After considering these line balancing & method study, we have developed a data base for all processes so that we can implement a proper layout with proper balancing for upcoming all styles.

Hourly Production Monitoring and Follow up :

After all, we have monitored all production by hourly even if proper result isn't come then required to follow up production for each 10 minutes/20 minutes. And have to discuss with all related peoples to find actual root cause & solve the matter.

Motivation:

After getting actual root cause, we have to motivate them properly. Even we can declare to give incentives, target bonus etc. Anyway we have to achieve our goals.

4. Results and Discussions

It has been seen from table 1 that productivity has been reduced from January, 2017 to May, 2017. It was not bad on January to April however lessen drastically from may, 2017. At the same time efficiency and income have been abated. This scenario of the productivity greatly impact on apparel supply chain. Apparel supply chain started from weaving or spinning and ended to end customer which has been depicted in the figure 1.

It is simplified from the table 2 that productivity has been reduced from January to May. Cutting quantity is 542025 pieces, sewing quantity is 519945 pieces, finishing quantity is 505220 pieces, packing quantity is 502950 pieces, and finally shipment has been done 502750 pieces on the month of January. It has been identified that the figure has been shrink to till in the month of the may 2017. After implementing the line balancing techniques productivity has increased from the month of June and also augmented related efficiency at the same month which portrayed from table 1.

We started analysis of the hourly productivity monitoring by developing simple Google docs data analysis system. Anyone of our respective responsible person can easily monitor and track hourly productivity and the reasons of the low productivity and any deviation from hourly productivity which has been exposed in the figure no 5. User can entry into this data tracking system through <http://ew.eastwestindpark.com/> and can see hourly target , hourly achievement factory wise building wise with proper reasons and then he can solve the issues found against low productivity and then would get the good results from the following hour. After having analysis of this online tracking system, productivity improvement occurred from the February ,2018 . Per day productivity achieved 22452 pieces. Efficiency has been intensified from 48 % to 51 % . And Income in the unit of FOB amplified \$ 174,871 daily basis and increase trend has been continued .

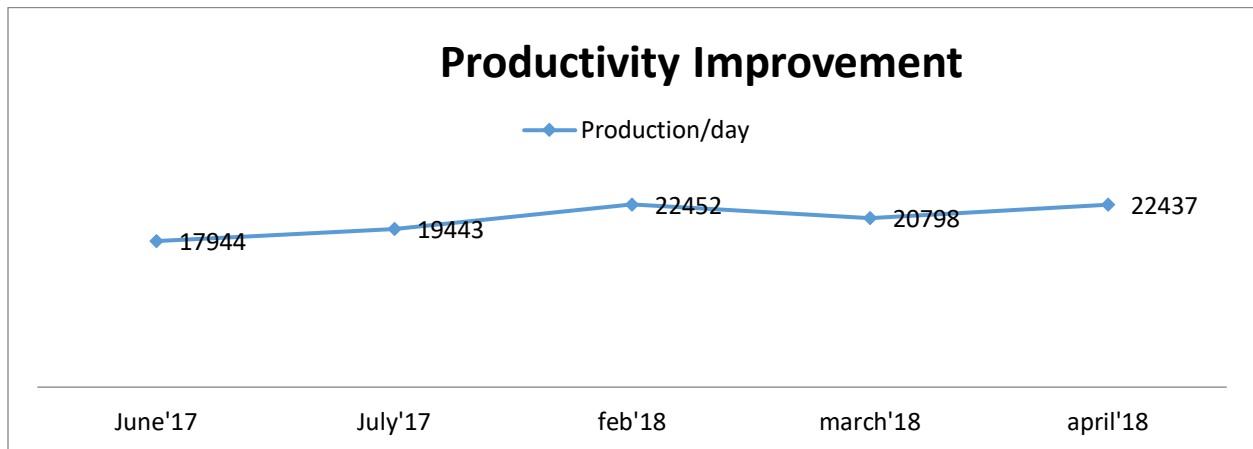


Figure 2. Month Vs. Productivity

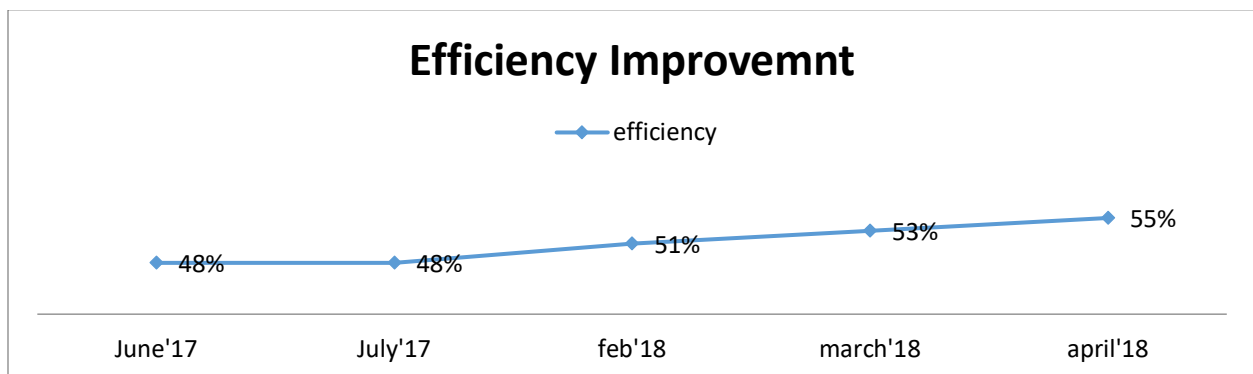


Figure 3. Month vs. Efficiency

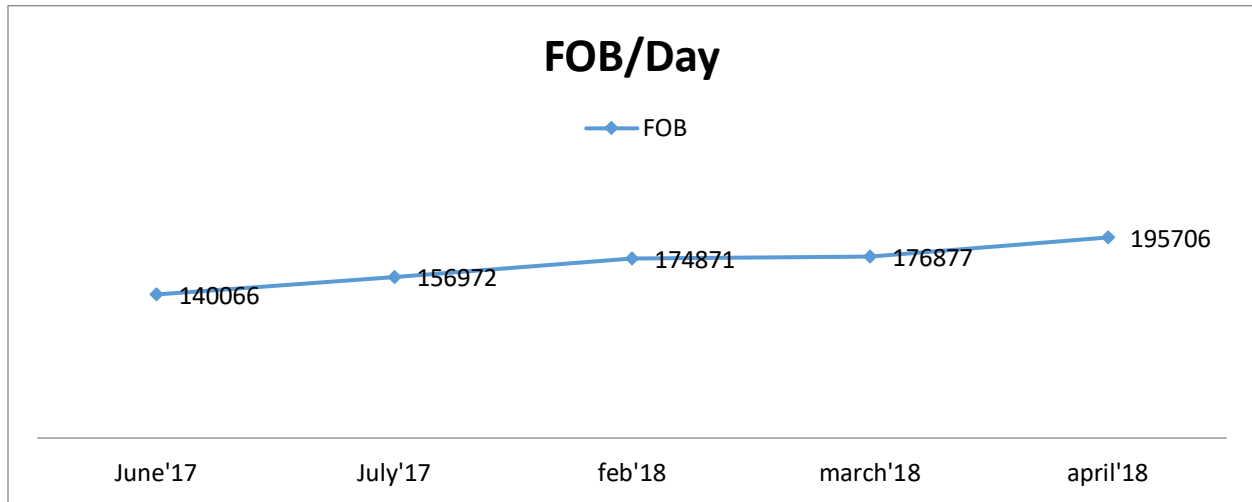


Figure 4. Month Vs.FOB

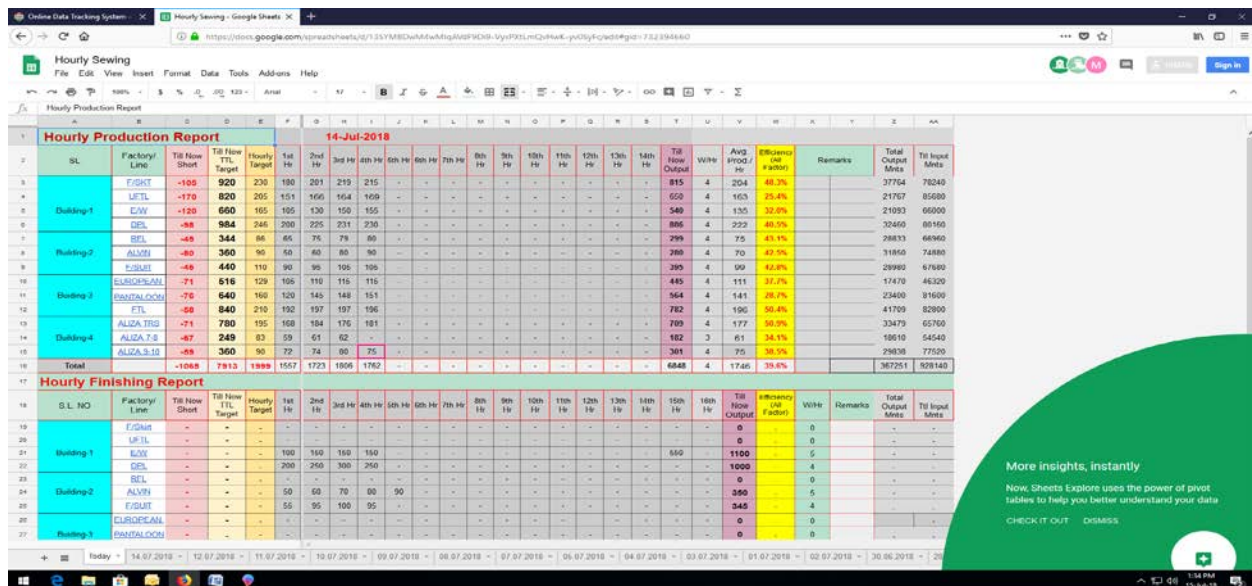


Figure 5: Online tracking system

5. Conclusions

The Ready-Made Garments (RMG) industry occupies a unique position in the Bangladesh economy. It is the largest exporting industry in Bangladesh, which experienced phenomenal growth during the last 30 years. The industry plays a key role in employment generation and in the provision of income to the poor. Time or Non Value Added Activity Time and take steps to reduce or minimize time, ultimately it will increase productivity. In this regard we implemented Line Balancing & other Techniques. As a result we get significant improvements. Efficiency has been increased by 17%. This type of continuous improvement will help Bangladesh to attain a high profile in terms of foreign exchange earnings, exports, industrialization and contribution to GDP within a short span of time as targeted level.

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Biographies

Shibbir Ahmad is Part time lecturer of Bangladesh Institute of Management in the department of Industrial Management ,Bangladesh . He earned B.Sc in Industrial and Production Engineering from Shah Jalal University of Science and Technology, Bangladesh. Masters in Mechanical Engineering from Rowan University, USA and current part time student of Dhaka University of Engineering and Technology ,Bangladesh. He has published journal and conference papers. He is also working as a CEO of East West group. Shibbir Ahmad has completed research projects with Dr. Mohammad Ali ,professor of Shah Jalal University of Science and Technology ,East West Industrial Park Limited, Apex Holdings Limited . His research interests include manufacturing, operation management ,Industrial engineering , mechanical engineering , lean and Supply chain management .

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