Analysis Of Transferable TQM Tools To Textile 
And Clothing Sectors

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Abstract
Textile & Clothing Industry in India accounts more than contribute more than 16% of Total Export items which significantly contributes the GDP growth of our country. After phasing out the multi fibre agreement (MFA), Indian Apparel industry is facing so many challenges to compete with global market due to open business market. There are so many hidden issues are higher labor cost, lower productivity & lower factory efficiency. Moreover many SSI units in our country is highly struggling to continue with their business. TQM is one of the tool that every manufacturer in India is trying to implement for which they can minimize the cost of production & increase the profitability. However transferring the company’s management practices such TQM, JIT from one place to another has many hurdles to cross.

Keywords: TQM, TQM Tools, Textile & clothing sector.

Introduction
Textile & Clothing Industry in India accounts more than contribute more than 16% of Total Export items which significantly contributes the GDP growth of our country. After phasing out the multi fibre agreement (MFA), Indian Apparel industry is facing so many challenges to compete with global market due to open business market. There are so many hidden issues are higher labor cost, lower productivity & lower factory efficiency. Moreover many SSI units in our country is highly struggling to continue with their business. TQM is one of the tool that every manufacturer in India is trying to implement for which they can minimize the cost of production & increase the profitability. However transferring the company’s management practices such TQM, JIT from one place to another has many hurdles to cross.

TQM Tools & Technique
Major purpose of using TQM tools are used to increase the productivity, improve the quality of the product, reduce the manufacturing cycle time, reduce the inventory, reduce the Lead time and minimize the production wastages (Russell, 1999). Key tools and technique for implementation of TQM/JIT system is production process (Melton, T, 2005) as follows.

a) Kanban-IT describes the pull based production system.  
b) 5S–A Visual House keeping tool, which devolved control to the production environment.  
c) Poka yoka-An error proofing tool  
d) Push System  
e) PDCA Cycle: Continuous improvement cycle.  
f) Total Productive Maintenance: Which deals that basic maintenance activity of the workstation  
g) Cellular layout-It is U shaped production layout which minimizes the product waiting time as well as the Work—in-progress.  
h) Kaizan –This tool deals about the continuous improvement in the production process.

Based on the product nature, Size & Goal of the organization tool can be selected & utilized.

3. PDCA Cycle:
PDCA is the key TQM tool which is developed by Demming a leading Quality Guru the elements of PDCA indicates that Plan, Do, Check, Act.

PDCA requires supportive management that allows for visible current production status and Compel countermeasures or improvements. PDCA also requires solid visual management, because visual systems such as report boards and line-side process reviews create a shared understanding of the production performance data with everyone involved with the production of products (Akai, 1988 & Akai, 1991).
5S System
5S tools is a structural system which organize the process & operation which means Sort, Set, Shine, Standardize, sustain (Hirano, 1996). This is one of the basic TQM tool which every one should follow towards enhancing their business performance. The 5S tool is a structural system to organize any type of business or operation, and 5S represents five steps including: sort, set in order or place, shine or scrub, standardize and sustain (Hirano, 1996). All these steps must be followed to have success with a 5S event or for an operation to say that they are 5S. However, the second and third step, set in order and shine, may be switched in order depending on the needs of the organization using 5S.

a) Sort
The first step, ‘sort’ means to separate what is necessary in the workplace which minimizes the problem related to annoyance at the workstation. Anything is not need in the workplace should be removed.

b) Set in Place
Everything in the work area has a place and it is always stored in it. This makes the tools easy to find and anyone should be able to find them and then replace them after use. In addition to this tools can be created with multiple functions to minimize the storage location. Properly setting things in order can eliminate a variety of waste in the workplace including: motion, searching, Human energy, excess inventory, unsafe working conditions, and using the wrong tools.

c) Shine
It is the third step which indicates the workplace should be kept neat and clean from dirt, dust, grease and grime. This builds a sense of pride in the employees, improves the work environment, provides for a safer workplace, and helps maintain equipment value. Cleaning can also be used as a form of inspection.

d) Standardize
This is the fourth step belongs to 5S system, which indicate the standardization of new creates like the way the task or the work is carried out so that any one can follow.

e) Sustain
The last and fifth step is ‘sustain,’ which indicates making a habit of properly following the correct or developed procedures regularly.

5. Lean Six Sigma
Six Sigma (6σ) quality is a problem solving methodology to minimized the percentage of defective items to be produced. 6σ mathematically represents that 3.4 PPM failure per million of product to be produced. This is equal to 99.9996% of perfection. Lean Six sigma means the lean principles are combined with Six sigma concepts which predict the gross root level approach on problem solving towards the production, quality and financial activity. Since small scale firms has less product mix, minimum employee strength easy span of control can easily implement Lean six sigma system than large level sectors.

6. Total Productive Maintenance
Total Productive maintenance (TPM) is another component of TQM, which works well with the collaborative implementation of 5S tool. The goal of this is to eventually train the operators to look after the equipment in their workstation (Nakajimi, 1988). Total Productive Maintenance (TPM) is another component of TQM, which works especially well with the 5s organizational system. As discussed earlier, one pillar of 5S is shine in which cleaning is used as a form of inspection. The goal of this is eventually train the operators to look after the equipment in their workstation (Nakajimi, 1988). Total productive maintenance assigns basic maintenance work such as: inspection, cleaning, lubricating, tightening, etc., to the operator. This frees up the technicians or maintenance team for productive maintenance, which includes higher value-added activities such as equipment improvement and overhauls, training, etc.

7. Kaizan:
The continuous improvement philosophy is called kaizan. Which is rather focusing on small continuous
improvement in the process that have a major impact over the long term. Further more Kaizan incorporates continuous involving everyone in the organization from the senior executive to worker level. This creates the motivated employee in the manufacturing floor. A Strong Kaizen culture must be in place for all aspects of Lean enterprises to succeed, which in turn increase the bottom line indirectly. (Mehmet c,2008).When a work force is focused thinking of improvement opportunities every day with the prioritizing the allocation of area’s were really improvement is required. Kaizen improvement proven to have such a profound affect on costs that some domestic companies have been able to avoid the outsourcing or relocating to low labour regions (Langer et al(2007).As said Kaizen culture does not affect the bottom line directly where it creates the culture of training every one to continuously look for small incremental improvements, subsequently this improvement will affect every process wastages.

8. Implementation of JIT Tools in Textile & Clothing Industry

As per the investigation Farhana(2009) about various Garment industry in Bangladesh for their utility of TQM tool in Textile apparel industry. It is understood that most of firm has effectively utilize the tool which minimize the WIP reduction such as cellular layout. Subsequently TPM, Kaizen, Kanban and 5S. Almost more than one tools will be utilized the firm for better performance. It is obvious that TQM System is implemented to the textile & clothing Industry with the support of Data rational Approach. Securing the full benefits of lean requires the need to concentrate on the whole value chain suggested by weiss (2001).

First Step: To observe the current process through value stream mapping and it bottleneck process. Subsequently group the products in to families for similar process. An example of such grouping is he

<table>
<thead>
<tr>
<th></th>
<th>Neck round making</th>
<th>Side seam</th>
<th>Collar making</th>
<th>Sleeve making</th>
<th>Hemming</th>
<th>Placket making</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polo T Shirt</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Round Neck T Shirt</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

Second Step: To create the new value stream with the support of above table. To establish the TALK Time (Time between the completions of each product). It is also necessary to find the capacity of the production line.

Third Step: To review the proposed value stream by observing the sequence of tasks each worker performs, break the operation into observable elements & identify the Value added as well as Non value added operation.

Fourth Step: Balance the Production line in line with the TALK Time.

Fifth Step: Design the suitable the TQM Tools such as Cellular layout, Kanbon, Kaizan, TPM, PDCA Cycle. and the process layout may be flexible, distance between the operations may be decreased. Minimize the material handling the process. Provide the visibility to allow the shop floor worker decision on problem solving.
Lean Implementation cycle

The above picture indicate the macro level of approach of Lean/JIT implementation to any kind of manufacturing system which indicate that JIT is the philosophy of continuous improvement, once the initial lean manufacturing implementation has been completed, the future state value stream map has developed for the first cycle become the current state map. The new current state map is then used to identify lean projects and develop subsequent developments (John S.W. Fargher, et al).

Benefits of TQM in apparel Industry:
Farhana has studied the performance improvement of JIT tools in apparel industries in Bangladesh. From his investigation he has took 100 different level of SSI units in Bangladesh analyzed the level of performance improvement in various industry with the support of various JIT Tools

1. Reduction in unit Production of the firm & Lead time

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Company Name</th>
<th>Unit Cost Before JIT Tool Implementation($)</th>
<th>After JIT Tool Implementation($)</th>
<th>Reduction($)</th>
<th>% of Improvement</th>
<th>% of Reduction in Lead time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fashion Point LTD</td>
<td>8.50</td>
<td>7.00</td>
<td>1.50</td>
<td>17.6</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Texas Fashion LTD</td>
<td>11.0</td>
<td>9.00</td>
<td>2.00</td>
<td>18.1</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>Beximco Fashion LTD</td>
<td>4.40</td>
<td>3.20</td>
<td>1.20</td>
<td>27.2</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>Shanta Industries LTD</td>
<td>10.0</td>
<td>8.00</td>
<td>2.00</td>
<td>20.0</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>DADA Ltd</td>
<td>1.40</td>
<td>1.30</td>
<td>0.10</td>
<td>7.1</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>Shanta Wash works</td>
<td>3.50</td>
<td>3.00</td>
<td>0.50</td>
<td>14.2</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>Armana Fashion Ltd</td>
<td>0.87</td>
<td>0.84</td>
<td>0.03</td>
<td>3.4</td>
<td>08</td>
</tr>
<tr>
<td>8</td>
<td>Shanta Denims</td>
<td>0.86</td>
<td>0.75</td>
<td>0.11</td>
<td>12.79</td>
<td>13</td>
</tr>
<tr>
<td>9</td>
<td>PAXAR</td>
<td>4.50</td>
<td>3.00</td>
<td>1.50</td>
<td>33.8</td>
<td>45</td>
</tr>
</tbody>
</table>

(Source: Farhana Ferdousi et al. International Journal of Business and Management Sep 2009)
**Conclusion**

TQM system reduces all form Non value added activity in all the level. TQM is all about the streamlining the flow of values through the organization. It is understood that most of the apparel firm in global level has implemented this system & found significant level of process improvement. Indian culture plays role on the issues of transferability of TQM tool to Textile Industry. Even though many of the organization has sophisticated machines and production set up, if the people who is engaged with the production process should not culturally qualified it is no use. As of Now we have not give up this attempt.

**References:**


[8] John S.W Fargher ,Jr ,”Director Missouri Enterprises”Lean Manufacturing and remanufacturing implementation tools”.


