**Name:** Heba Mohamed Okasha Abou ElKamal Mohamed Elsayegh

**Position:** Lecturer at (Textile printing, dyeing & finishing) department

**Faculty:** Faculty of applied arts –Benha University- Egypt

**Research title:** Effect of implementation 5s methodology in warehouses at the Egyptian textiles & apparel factory (Case Study)

## Abstract:

This paper introduces the effect of implementation 5s method in the Egyptian apparel & textile factories as a real case study and how this implementation of 5s makes a direct effect in increase cleaning, saving time, effort and money, 5s reduce defects, eliminate waste and making a growth in productivity. Also ensure ergonomic in the workplace.  So this research aims to achieve & make these previous results & impacts, by implementing 5s methodology in the 2 main (Textile and accessories) warehouses in an Egyptian apparel factory. The researcher and some members from kaizen center Productivity and quality improvement center, one of the (Technology& innovation centers) In the Egyptian (industry & trade ministry) implemented 5s and making a code system in the 2 warehouses in textile & apparel factories. By applying 5s in the Egyptian factories, we can reduce and eliminate waste, increasing productivity. So, when you apply 5s, you can compete with your products in the local and the international market.

**Keywords**: 5s methodology, 5s in Apparel &textile, Kaizen, Continuous improvement, textile &apparel warehouses.

## 1. Introduction:

5S is a workplace organization method and one of the most important tools in Japanese management to reach to the highest degree of cleaning, arrangement, sorting… and safety. It is an important part of the Toyota Production System (TPS) and it is very important & fundamental tool to promote and lasting continuous improvement (Kaizen) in factories & organization and kaizen is a Japanese word means "changes for the better" even it is small change. Also 5s can achieve efficiently, effectively, saving time, effort and money. Also 5s is supporting and basic tool to achieve the visual management in the workplace of factories, organizations and everywhere. Also 5s is considered a foundational and fundamental of lean management.

## 2. Theoretical framework:

### - The 5s can be defined as:

5S comes from 5 Japanese words and each of them starts with S. These are seiri which means sort , seiton means ( set in order ), seiso means shine, seiketsu means standardize
, and shitsuke means sustain , if we translate these 5 Now, 5S have two additional points 6th "S" for "Safety" and the 7th "S'' is "Security". These two new points objective is to make safe workplace for all employees. It is employer's responsibility to provide safety and security for both factory and office place in textile and apparel industry.

### -Logic of using 5s

The logic behind the 5S practices is that factory, neatness, cleanliness, standardization and self-discipline at the workplace can help production of high quality products and delivery of high quality services with little or no waste ( eliminating waste ), and with high productivity. The 5S has become the way of doing business not only to impress the customers but also to establish effective quality processes as prerequisites for good products and services. The 5S training and implementation can be carried out separately or as part of ISO9001:2008/Lean Manufacturing/Six Sigma implementation. With its universal appeal, the 5S can be effectively implemented in any organization from any business sector.5s should be a culture & life style everywhere.

## 3. Statement of the problem:

-A lot of Egyptian textile and apparel factories don't implement the 5s methodology in the workplace, so this factories   lose a lot of time, effort and money.

- Egyptian textile and apparel factories don't implement the 5s and continuous improvement (Kaizen). So they don't achieve high productivity.

-A number of textile and apparel factories in Egypt currently are not applying methods like (5s) that will achieve high productivity and excellent quality standards to make them more competitive in the local & international markets and also meet the client requirements& expectation.

## 4. Importance of the research (significance):

- This paper introduces the implementation of 5s in the Egyptian apparel factory as a (real case study) and how this implementation of 5s makes direct effects in increase cleaning, saving time, effort and money, reduce defects and making a growth in productivity , also make the Egyptian products compete with other products in the local and the international market.

## 5. Aims &Objectives of the research:

The aims & objectives of this research are to:

- Map out the awareness of importance of applying5s methodology in the workplace of the Egyptian textile & apparel factories.

- Assess the mindset for implementation 5s & continuous improvement to achieve high productivity in the textile & apparel Egyptian factories.

-Measure and analyze the effect of applying 5s in saving time, effort and money in the 2 main warehouses in the Egyptian textile and apparel factory.

## 6. Research Hypotheses:

- It is hypothesized that applying& implementation 5s methodology and Kaizen concept in the textile & apparel factories will achieve efficiently, effectively, saving time, effort and money ,reduce defects, help in eliminating waste  and making a growth in productivity.

 - It is hypothesized that applying & implementation 5s methodology can make textile and garment products compete in the local and the international market by reducing cost and making a growth in productivity.

## 7. Research Borders (Outlines):

The research has been limited to this (case study) as one of the successful stories and real implementing of 5s.Also establish  a coding system in  the 2 warehouses in  the textile and apparel Egyptian factory and analytical the results of this case study .

## 8. Research Methodology:

The research uses a mixture of application (experimental) & analytical research methods.

- Application (experimental) method: by implementation 5smethodology in the two warehouses in the Egyptian textile & garment factory.

- Analytical method: by analyze the results of implementing 5s in the 2 warehouses and making awareness of 5s & Kaizen in the workplace and between the workers.

## 9. Textile & Apparel industry in Egypt:

    There are a lot of small and medium textile & apparel enterprises & factories in Egypt. According to the vision of Egypt textiles' strategy ( National council on textiles) that said, Egypt to become the leading exporting MENA country in the Textiles industry, focusing on high and medium value added products catering to the world's largest retailers and manufacturers with reliable and agile delivery.

In doing so, Egypt will utilize its full value chain integration from cotton cultivation to the finished product as final textile & Apparel. So Egypt should follow all the methodologies that can help in achieving optimize productivity and one of these methodologies is implementation 5s methodology in small and medium textile & apparel enterprises & factories.

## 10. Steps after implementation 5s in the targeted factory

### 10.1- (Factory scan visit):

The researcher and some members from kaizen center (Productivity and quality improvement center) choose one of textile & apparel factories:

- The factory size is medium and the industrial sector is (Textile & Ready Made garment), this factory under study is located among various other similar small and medium enterprises engaged in manufacturing of textile and apparel in one of the industrial Egyptian zones.

- At the beginning, we make a team consist of a researcher and a team from kaizen officers (productivity & quality improvement center), one of technology and innovation center, industry council – ministry of trade & industry.

- Then the team make quick scan visit to the targeted factory. The team collect the data about the factory included the following: (General & financial information – production information which includes the main raw material and products – process layout).

- Checklist consists of 20 items check (the work environment and quality scan).

- The team indicates the (findings during visit) from the checklist (table 1), which had been made and indicates the results from the previous points & observations.

| No. | Item Description | Rating Scale: 0-5 (Poor = 0, Excellent = 5) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | 0 |
| | | (Excellent) | (few items to complete) | (Showing concept no good implement.) | (Implemented before, no commitment) | (Have idea, no plan to implement.) | (Have no Idea) |
| 1 | Removing Unnecessary Items الاستغناء عن الأغراض الغير مستخدمة | | | | 🔴 | | |
| 2 | Storage of cleaning equipment أدوات النظافة | | | 🔴 | | | |
| 3 | Floor cleaning نظافة الأرض | | | 🔴 | | | |
| 4 | Bulletin boards لوحة متابعة العمل | | | | | | 🔴 |
| 5 | Emergency Access مخارج و معدات الطوارئ | | | | | | 🔴 |
| 6 | Items on floor الأشياء على الأرض | | | 🔴 | | | |
| 7 | Aisle ways - marking تعليم الممرات | | | | | | 🔴 |

| # | Item | | | | | | |
|---|------|---|---|---|---|---|---|
| 8 | Aisle ways - maintenance<br>صيانة الممرات | | | | | | 🔴 |
| 9 | Storage & arrangement<br>صيانة المخازن | | | | 🔴 | | |
| 10 | Equipment - painting<br>دهان المعدات | | | | غير موجوده فى هذه الصناعة | | |
| 11 | Equipment - cleanliness<br>نظافة المعدات | | | | 🔴 | | |
| 12 | Equipment - maintenance صيانة المعدات | | | | | 🔴 | |
| 13 | Equipment -storage<br>تخزين المعدات | | | | | 🔴 | |
| 14 | Documents - storage<br>تخزين المستندات | | 🔴 | | | | |
| 15 | Documents - control<br>حفظ المستندات | | | 🔴 | | | |
| 16 | Tools & gages - arrangement<br>ترتيب الأدوات و أدوات القياس | | | | 🔴 | | |
| 17 | Tools & gages - convenience<br>سهولة الوصول للادوات و معدات القياس | | | | | 🔴 | |
| 18 | Shelves, benches, & desks - arrangement<br>ترتيب الأرفف و الطاولات | | | | 🔴 | | |
| 19 | Shelves, benches, & desks - control<br>الحفاظ على الأرفف و الطاولات | | | | | 🔴 | |
| 20 | 5s control & maintenance<br>المحافظة على تطبيق ٥ت و صيانتها | | | | | 🔴 | |

(Table 1) clarify the checklist items which had been checked during the Scan visit- the final result indicated by the team (the researcher and the kaizen officers)

## 10.2 Finding during visit in the factory:

-  The result showed very obvious; there are no arrangement, no cleaning, no sorting, no discipline and no filling in many places in the factory, especially in both the accessories and the textiles Warehouses, as shown **in table (2)**.

- There is no coding system for the items in the accessories and the textiles warehouses.

- There are a lot of defects in the accessories and the textiles warehouses.

- There is inventory without classification of unused accessories and textiles from the previous seasons.

- There are no accurate data calculations (how many meters can be used for every piece and also to the whole production).

- There is no maintenance for tools & equipment's workshop space.

- There is no safety system for the factory &workers.

### 10.3 The decision of the team:

After quick scan visit and indicate the finding during visit as mentioned, the team decided to start with the two warehouses (accessories & textiles) as two important pilot areas, which are very critical to start with , to implement 5s methodology on it.

### 10.4: Suggested improvements measures (Plan the improvement):

The methodology of implementing the 5s in the factory will depend on PDCA cycle:

According to the PDCA cycle (Plan-Do-Check-Act), the team makes & executes the following points as mentioned:
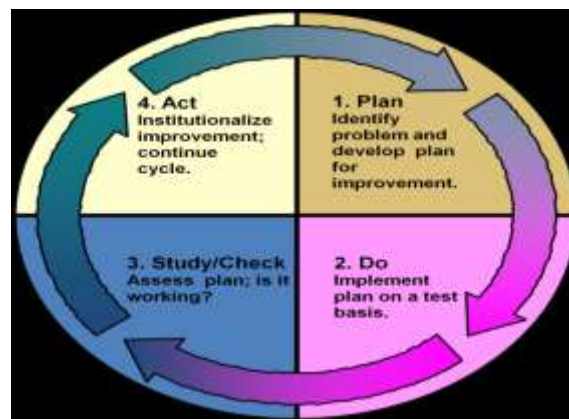


Fig (1) clarify the PDCA cycle which following during the implementation of 5s improvement

- providing 5s training workshop to the workers

- Implementation 5s in the two warehouses as 2 important pilot areas, that necessary begins with.

- Eliminate searching time at the accessories & textile warehouses by adding coding system and link it with general system in the factory.

- Making rules & regulations for handling & delivering all the items from the accessories & textile warehouses to the production department (Person in charge who is responsible about everything)

- Making coding system for every item in the warehouse defined by (item-color…………) and make it as the excel sheet to make a daily follow-up to all items.

### 11: Implementation 5s in the Accessories & textile Warehouse (Case study):

Fig (2) clarify the 5s's steps which have been implemented in accessories and textile warehouses

### 11.1 -The plan of implementation 5s in the accessories & textile warehouse includes the following points:

### 11.1.1 - 5s awareness session:
- The researcher and the kaizen team make (2) sessions, about the (5s awareness & culture) during 2 days, (4 hours training per day) in the factory, the awareness session includes attendees (6) persons, who were the heads of all the departments in the factory as shown in pic (1) & (2), then they will transfer this culture and awareness to all the employs and all the team.
- The actual work of implementing 5s in the accessories warehouse, from the team around (4 times visit to the factory, every visit includes 5 hours = around 20:25 hours).
- The work in the textile warehouse includes around (4 times visit to the factory, every visit 5 hours = around 20:25 hours).

### 11.1.2 - 5s implementation inside the factory includes:
Work with the team of the factory in the following points:

- Making Cleaning & painting  (Shine or Sweep), for the accessories & Textile warehouses.

- Covering the floor (Shine or Sweep), for the accessories & Textile warehouses.

- (Sort) for all the items in the accessories & textile warehouses, then (set in order) by indicate place for it.

- (Standardize or discipline) by making system in the computer for every item with (Codes, colors, quantities, kinds ..................)

- (Sustain) by Maintain and further develop the standards have been achieved. Also, make continuous improvement (Kaizen) by indicating the system for all the coming items in all the

accessories and textile warehouses.  And fixed this system to all the coming accessories & textile items, also recruit person in charge with the accessories and textile warehouse.
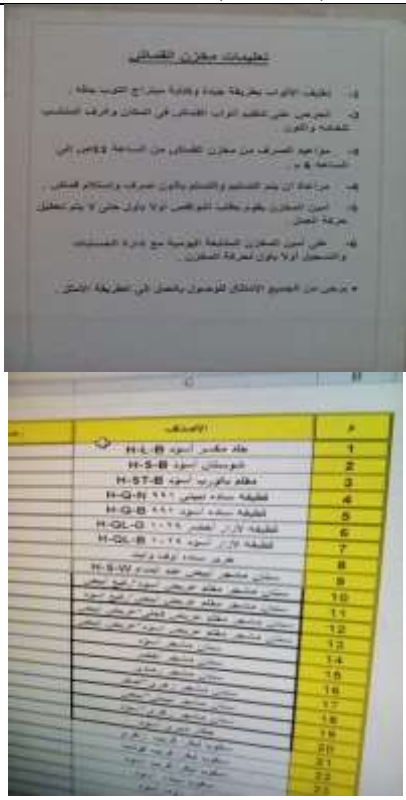
| 5s awareness (session) | 5s awareness (session) |
|---|---|
|  |  |
| Pic (1) show the attendees from the factory in 5s awareness lecturer | Pic (2) show the trainer of 5s awareness from the kaizen center inside the factory |

| N | Before | After | 5s implementation |
|---|---|---|---|
| 1. | <br>Pic (3) show the accessories warehouse before cleaning & painting | <br>Pic (4) show the accessories warehouse after cleaning & painting (Shine or Sweep) | **(Shine or Sweep) seiso**<br>- Cleaning, remove trash or dirt covering, painting and polishing all the workplace (Accessories Warehouse )<br>- Making a good light in the place ( accessories warehouse ) |
| 2. | <br>Pic (5) show the textile warehouse before cleaning & painting | <br>Pic (6) show the textile warehouse after cleaning & painting (Shine or Sweep) | **(Shine or Sweep) seiso**<br>- Cleaning, remove trash or dirt covering, painting and polishing all the workplace ( Textile Warehouse )<br>- Making a good light in the place ( Textile warehouse ) |

| | | | |
|---|---|---|---|
| 3. | <br><br>Pic (7) show the textile warehouse before sorting the items | <br><br>Pic (8) show the textile warehouse after sorting the items<br>**Sort** ( **Seiri** ) | **Sort** ( **Seiri** ) by<br>- Search the useful (needed) and useless (unneeded) of th ( Textile Warehouse )<br>- Separate the two items, and then classify them.<br>- Remove what is not needed and keep what is needed.<br>( Textile warehouse ) |
| 4. | <br><br>Pic (9) show the accessories warehouse before cleaning & painting | <br><br>Pic (10) show the accessories warehouse after cleaning & painting<br>**Sort** ( **Seiri** ) | **Sort** ( **Seiri** ) by<br>- Search the useful (needed) and useless (unneeded) of the accessories items.<br>- Separate the two items, and then classify them.<br>- Remove what is not needed and keep what is needed.<br>( accessories warehouse ) |
| 5. | <br><br>Pic (11) show the accessories ware house before arrange essential items | <br><br>Pic (12) show the accessories warehouse after arrange essential items<br>**Set in order** ( **Setion** ) | **Set in order** ( **Setion** ) by<br>- Arrange essential items of accessories in order for easy access.<br>- Gives written description according to their use, kinds, amounts…..<br>( accessories warehouse ) |

| 6. |  Pic (13) show the textiles ware house before arrange essential items |  Pic (14) show the textile ware house before arrange essential items **Set in order ( Setion )** | **Set in order ( Setion ) by** <br> - Arrange essential items of textile in order for easy access. <br> - Gives written description according to their use, kinds, amounts….. <br> ( Textile warehouse ) |
|---|---|---|---|
| 7. | There is No Standard, No coding and no rules & regulations was in the accessories warehouse |  Pic (15) show the accessories ware house after making coding system for all items and making rules & regulations for all handling process | **Standardize ( Seiketsu ) by** <br> - Establish standards, coding system and guidelines with rules & regulations to maintain a clean workplace ( accessories warehouse ) |

| | | Standardize ( Seiketsu ) | |
|---|---|---|---|
| 8. | No Standard, No coding and no rules & regulations was in the textile warehouse | <br><br>Pic (16) show the textiles ware house after making coding system for all items and making rules & regulations for all handling process<br>**Standardize ( Seiketsu )** | **Standardize** ( **Seiketsu** ) by<br>- Establish standards, coding system and guidelines with rules & regulations to maintain a clean workplace (Textile Warehouse) |
| 9. | <br><br>Pic (17) show the accessories warehouse before Make all the previous 4s like a habit of property | <br><br>Pic (18) show the accessories warehouse after Make all the previous 4s like a habit of property<br>**Sustain ( Shitsuke)** | **Sustain** ( **Shitsuke**) by<br>- Make all the previous 4s like a habit of property to the all to make correct procedures.<br>- Make a motivation to the all people towards work & achieving self-discipline.<br>( accessories warehouse ) |

| 10 | <br>Pic (19) show the textile warehouse before Make all the previous 4s like a habit of property | <br>Pic (20) show the textile warehouse before Make all the previous 4s like a habit of property<br>**Sustain ( Shitsuke)** | **Sustain ( Shitsuke)** by<br>- Make all the previous 4s like a habit of property to the all to make correct procedures.<br>- Make a motivation to the all people towards work & achieving self-discipline.<br>(Textile Warehouse) |
| 11 | <br>Before implementing 5S | <br>After implementing 5S | Before & after implementation 5s methodology |
| | <br>Pic (21) show the researcher and the person in charge before implementing 5s | <br>Pic (22) show the person in charge after implementing 5s ( accessories warehouse ) | Before & after implementation 5s methodology |

Table (2) show the actual steps and implementation of 5s inside the two chosen pilot areas (accessories and textile warehouses), the table show pictures (before & after 5s implementing)

## 12. Conclusion & results

Implementations (5s) in the two warehouses (Accessories & Textile) achieve many important results & benefits like as shown in this case study:

| | **Reduce** | **Improve** |
|---|---|---|
| 1- | Time of searching ( Waste of time ) | Creating organized work place |
| 2- | Waste of motion | Efficiency |
| 3- | Waste of money by reducing & lowering costs of purchasing accessories 25% ( according to assistant manager ) | Saving time, effort and money |

| | | |
|---|---|---|
| 4- | Waste of money by reducing & lowering costs of purchasing textile <u>15%</u> ( according to assistant manager ) | High quality to Achieve sustain high quality |
| 5- | The previous points of eliminating & reducing ( time, motion…and money) , reducing the total Cost of the product, so the product can compete in local and international market | Growth greater employee satisfaction |
| 6- | | High growth and optimize productivity |
| 7- | | Growth greater employee satisfaction & self-discipline |
| 8- | | Client Satisfaction |
| 9- | | Suggestion many ideas for improving productivity through the 5s from the employees to Improve the working conditions and reduce the waste (MUDA). |
| 10- | | Using visual cues as a beginning of implementing visual management |

## 13. Recommendation:-

Implementations (5s) in the warehouses of the Egyptian textile and apparel factories, will achieve good result in eliminating all kind of waste (time, motion, money …………..), and will make High growth, reducing total cost of the product and optimize productivity.

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