

Supply Chain Operation Model in Terms of Raw Material in Bangladesh Apparel Industry

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Abstract The main objectives of this study are to highlight the importance of supply chain operation model in respective of raw materials in Bangladesh apparel manufacturing industries, which is the main export earning product of Bangladesh. In apparel manufacturing industry, various parties are involved in a chain process like the suppliers, manufacturers, and buyers. Each stage consists of sourcing, procurement, manufacturing, replenishment; customer order is incompatible with the next stage. The conceptual model has been provided by this study helps apparel manufacturer to make the cost effective working process of collecting raw materials as well as reduce the time period. This operation model of raw materials creates scope to optimize the supply chain working procedure of this industry. The work load of merchandising will be reduced by implementing this model practically, which help to create efficient team and also helpful to remove obstacles which are faced by merchandising team during apparel production. Thus, they can meet up the buyer's critical path schedule and export within the lead time. Finally, this model will help to enhance the production process flow.

Keywords Apparel Industry, Merchandising, Operation Model, Raw, Material, Sales & Distribution, Supply Chain

1. Introduction

About 60 million to 75 million people are involved in the textile, apparel and footwear sector worldwide (2014). It has been found that about three quarters of apparel industry workers worldwide are female. [1]

The world's women's wear industry 2014 is worth 621 billion USD (497 billion EUR)

The men's wear industry is worth 402 billion USD (322 billion EUR)

The children's wear industry is worth 186 billion USD (estimated) (149 billion EUR). In 2014 World Garment Exports value was 708 billion USD (567 billion EUR); 412 billion USD (330 billion EUR). [3]

In 2011 report of top Garment Producing Countries Bangladesh was in second position and they export 20% of their product to US market. [3]

At present Bangladesh is one of the biggest apparel exporters in the world and its export volume is increasing day by day. There are 5000 apparel manufacturing in Bangladesh where 4 million people are directly involved. From below export report, we can easily find the contribution of apparel industry in Bangladesh which contribute 81.71% (25491.4 Million US \$) of total export.

Table 1.1. Export Report of Bangladesh. [4]

| YEAR | EXPORT OF RMG (IN MILLION US\$) | TOTAL EXPORT OF BANGLADESH (IN MILLION US\$) | % OF RMG'S TO TOTAL EXPORT |
|---------|---------------------------------|--|----------------------------|
| 2000-01 | 4859.83 | 6467.3 | 75.14 |
| 2001-02 | 4583.75 | 5986.09 | 76.57 |
| 2002-03 | 4912.09 | 6548.44 | 75.01 |
| 2003-04 | 5686.09 | 7602.99 | 74.79 |
| 2004-05 | 6417.67 | 8654.52 | 74.15 |
| 2005-06 | 7900.8 | 10526.16 | 75.06 |
| 2006-07 | 9211.23 | 12177.86 | 75.64 |
| 2007-08 | 10699.8 | 14110.8 | 75.83 |
| 2008-09 | 12347.77 | 15565.19 | 79.33 |
| 2009-10 | 12496.72 | 16204.65 | 77.12 |
| 2010-11 | 17914.46 | 22924.38 | 78.15 |
| 2011-12 | 19089.69 | 24287.66 | 78.6 |
| 2012-13 | 21515.73 | 27027.36 | 79.61 |
| 2013-14 | 24491.88 | 30186.62 | 81.13 |
| 2014-15 | 25491.4 | 31198.45 | 81.71 |

An efficient Supply chain systems helps to reduce inventory cost, operational costs by effective material planning, reduce order cycle time, reduce logistic cost, develop asset productivity as well as increase the companies receptiveness to the market. Other than above benefits, the apparel manufacturing industry is able to achieve fast

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response through efficient supply chain practices.

The summary view of apparel business process is given below:

Supply chain management requires the synchronization of activities & flows that widen across boundaries. The flows of raw materials, information, resources and knowledge across a supply chain are often split and uncoordinated.

SCM in RMG Industry

Lam and Postle (2006) have reviewed the idea of supply chain management for textile industry and apparel supply chain management for Bangladesh apparel manufacturer. [6] They have discussed the strength and challenges of supply chain in Bangladeshi apparel manufacturer. [6] The major findings of their research were that Bangladesh apparel manufacturer are not attentive of the concept of supply chain and industrial standard for both manufacturing and retailing industries. [7] Nuruzzaman and Rafiq (2005) took an effort to develop more effective supply chain for Bangladeshi RMG to benefit from competitive advantage from the international apparel business through analyzing the present

supply chain and investigating the relationship among the supply chain professionals [9]. Islam Islam (2013) analyzed that apparel supply chain matters such as new orders, raw materials supply, production processes and logistics related to finished goods delivery by using efficient supply chain process and also mentioned that Bangladesh garment industry improvement is desired in reducing the supply time required to produce and fulfill the orders placed by foreign companies. His findings is using modern fast and effective machinery can reduce time taken to deliver the order. [9]

Asgari and Hoque (2013) examined the prospect that lies in an integrated supply chain to provide a competitive advantage to the Bangladesh RMG sector. They have used a system dynamics approach to determine the main variables which determines the performance of supply chain such as enablers, performance or results, and inhibitors in apparel industry. Since the end user of the apparel fashion market are becoming all the time more time-sensitive, a lessen in lead time, besides quality and costing criteria, is needed to increase more orders from retailers. [9]

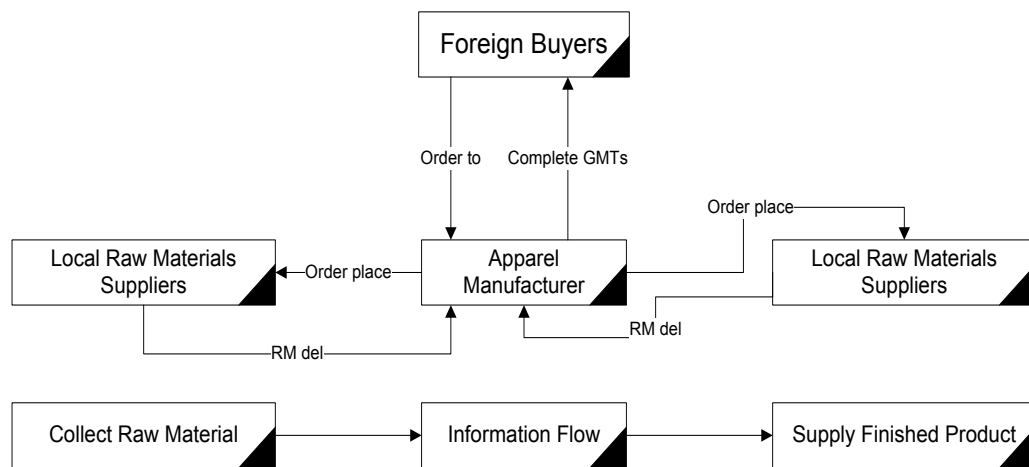


Figure 1.1. Business Structure and Raw Materials Suppliers [12]

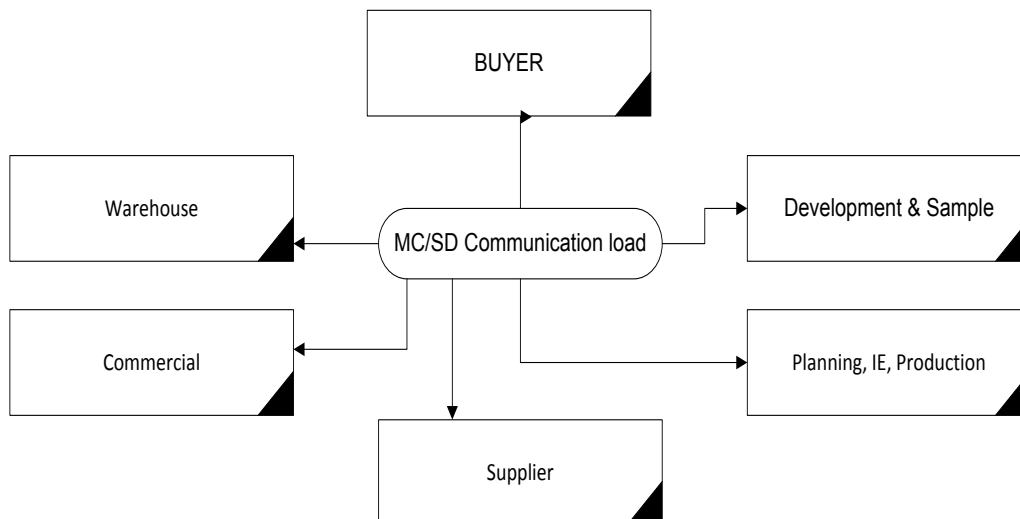


Figure 1.2. Merchandiser/Sales & Distribution communication load

Areas of supply chain in apparel industry for raw materials are below:

- 1) Material Management
 - I) Sourcing
 - II) Purchase & Procurement
- 2) IE, Planning, Production
- 3) Commercial
 - I) Import
 - II) Logistic
 - III) CNF
- 4) Warehouse

We briefly describe activities of below wings of supply chain in respect of raw materials. Before that we can find the diagram of communication load of merchandising or, sales and distribution team,

From above diagram one can easily get idea of merchandising /sales & Distribution have to maintain liaison with both Buyer, Internal & External customer which is difficult one.

Now we briefly discuss supply chain wings of raw material in contrast of Bangladesh apparel industry.

1. Material Management:

International Federation of Purchasing and Materials Management defines materials management as materials management is a total idea having its distinct organization to plan and control all types of materials, its supply, and its flow from raw stage to finished stage so that deliver the product to customer as per their required delivery schedule. [9]

Material Management involves materials planning, procuring, receiving, storing, inventory control, production, corporeal distribution of raw materials. The materials manager has to manage all these functions with right authority and responsibility in the material management department. The historical background about the materials management is as follows. [11]

Main Objectives of Materials Management is to planning, procuring, storing and providing the appropriate materials of the right quality, Right quantity, right place, right time, and right price so as to manage and schedule the production activity in an integrative way for an industrial undertaking. [11]

The key activities of Material Management is like to identify key stockholders, Identify Acceptable supplier, Determine supplier capabilities, Supplier profile analysis, forecasting, generate demand, finalize business terms and conditions, get price benefit by negotiation, Competitive market analysis, supplier assessment and rating.

2. IE, Planning, Production:

Industrial Engineering is one of the key parts of apparel industry, for the supply chains of raw materials they are relate to provide some essential consumption like thread, tape etc. They play role to save capital and control wastage of raw materials. Based on Planning and Production schedule, material management have to plan raw material planning

because an effective planning can save inventory cost, production cost. Planning and Production is the ultimate customer of material management.

3. Commercial:

All supply chain represents a transactional commercial flow, which means that the materials flow that run throughout the supply chain changes its rights from one originations to another, from supplier to buyer and it's repeat until goods reach to the end user. This transactional commercial flow will only take places in supply chain where more than one organization. [12]

In Bangladesh apparel industry commercial(Import, Logistic, CNF) they are saving documentation cost of raw materials by applying technique during raw materials purchase and procurement. They are playing vital role in supply chain to expedite payment, transportation support to material management, reducing inventory cost by release raw materials on time.

4. Warehouse:

In apparel industry warehouse play most critical part because they have to handle all raw materials and complete apparels until dispatch of garments.

There are lots of options to reduce processing cost by a better warehouse team i.e. adjust raw materials stock, Inventory control, properly issue and transfer of raw materials. In the earlier stage they have to check quality of raw materials, prepare shade band as per quality of items and prepare complete trims card based on which planning and production finally go to start sewing. And at the last stage when garments dispatched they prepare stock report based on which material management take decision of wastage percentage and consumption for upcoming order.

2. Methodology

A widespread literature survey has been undertaken in order to review the current condition of supply chain, growth and development in the apparel industry. In this study we have collected both primary and secondary data, primary data were collected from renowned garments factory of Bangladesh and secondary data were collect from different books, journal, publications and internet.

Supply Chain Operation Model in terms of Raw Material (SC-OPM-RM)

The RMG industry is highly dependent on imported raw material. About 90% of woven fabrics and 60% of knit fabrics are imported to make garments for export. That's why this industry has taken maximum lead time to process an order [8]. In Bangladesh, the lead time for apparel export varies between 90-120 days. [6]

Raw Materials:

1. **Fabric Item:** In apparel industry fabric takes maximum lead time because of its manufacturing process. Because fabric is a planar textile structure

produces by interlacing yarns, fibers, or filaments [13]. In Bangladesh, we use two types of fabric (Woven, Knitted). At present, we have to procure 90% of woven 60% of knitted fabrics from foreign supplier because of buyer nomination and our in-house limitation of manufacturing facilities. All of the fabric items are in input process because garment production mostly depends on fabric. [13]

2. **Non-Fabric Accessories:** Non-fabric items are accessories and packaging material, which are needed during apparel production i.e.: Label, Thread, Button, Zipper, Elastic, Hangtag ticket, Drawcord, Eyelet etc.

Intangible operation model of supply chain of apparel industry of Bangladesh in terms of Raw Materials are represented in below **figure 2.1** in RMG sector, all the Bangladeshi garment companies are subcontractor. Areas of supply chain in apparel industry for raw materials are below:

Material Management: the entire working process of material management consists of raw material Sourcing and Purchase & Procurement team. Sourcing is started from the sampling or development stages. **In these stages the sourcing team has to do following activities as per proposed model.** They are:

- Receive RM Requirements from Development / Sample team
- Receive buyer approved Artwork/physical sample/technical pack whatever available at Merchandiser/Sales & Distribution team.
- Sourcing Supplier (multiple 2or 3)
- Place sample order booking
- Collect & submit sample to MC/SD/Buyer whatever require
- Collect approval from MC/SD
- Select supplier
- Confirm price, lead time and business terms & condition.

In Bulk stages, Purchase & Procurement team do the following activities:

- Receive details order sheet/Check list/Budget sheet from Merchandiser
- Take consumption from related department (CAD, IE, Pattern)
- Check consumption with merchandiser provided BOM (ERP or, Checklist)
- Check current stock status of RM with warehouse or, ERP system
- Prepare booking (System generated or Manual) & proceed to selected supplier
- Receive PI from supplier with expected RM Delivery date
- Collect garments delivery date from MC and Production plan from Planning Team

- Update material Plan to Planning, Merchandising, warehouse team
- Create ERP or Other's system PO against PI and take PI approval from Head of SC or, authorized person
- PI pass with PO to commercial (import) team to proceed payment (LC, TT as per policy)
- Payment proved (LC, TT draft) pass to supplier
- Follow up ETD with supplier and collect necessary shipping documents
- Pass shipping documents to commercial (Logistic, CNF)
- Follow up with commercial (Logistic, CNF) until RM in-house
- Check RM receive and Inventory status with warehouse
- Take trims card from warehouse and check quality report
- Check RM transaction (Issue, Transfer) with warehouse
- Take RM stock or, closing balance from warehouse after garments deliver to Buyer/Retailer
- Assess supplier half yearly or, yearly basis and take business facilities from supplier
- Analyze RM stock and report to Head of Supply Chain with appropriate reason and recommendation.

IE, Planning, Production

The activities of IE team as per proposed operation model of raw materials are to provide consumption of accessories like: Sewing thread, Elastic, Different type of tapes etc.

Planning & Production team provide their production plan to material management so that they can plan a better raw material plan which will help to meet garments delivery date as per buyer.

Commercial: The activities of commercial team as per proposed operation model of raw materials are to proceed payment and confirm it to material management, Logistic and CNF support so that raw materials in-house on time.

Warehouse: In this model warehouse activities is most important because they have to provide stock report to material management before placed booking to raw material suppliers, properly maintain stock label, on time Inventory, raw materials receive, quality check by warehouse quality team, submit trims card to material management.

Based on above below is the proposed Supply Chain Operation Model in terms of raw material in Bangladesh apparel industry.

If apparel manufacturing industry in Bangladesh use Supply Chain Operation Model in terms of raw material then they can get below facilities: Inventory cost will reduce by well-planned material planning, able to use best stock label, lead time of raw material will be reduced due to proper material plan, maximum business facilities could be taken from supplier in terms of volume and value of raw materials.

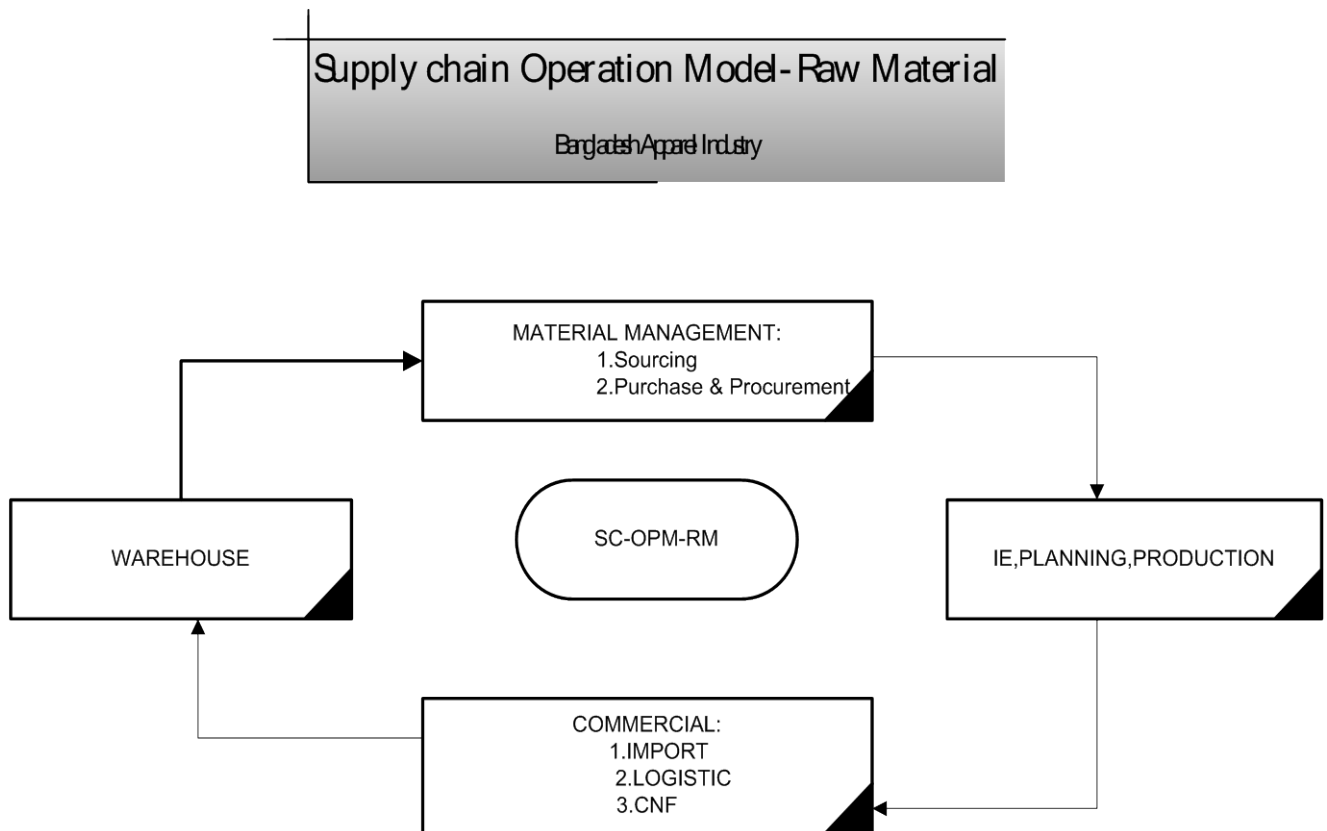


Figure 2.1. Supply Chain Operation Model in terms of Raw Material (SC-OPM-RM) in Bangladesh apparel industry

3. Conclusions

The Apparel Manufacturing Industry is a major and vital business sector in Bangladesh overall economy. If we look at the apparel export rate from at the beginning from 2000's to 2015's then we can easily know the evolution of this process. But the Supply Chain process in Apparel Manufacturing Industry is scattered in point of view of Bangladesh which is lagging behind in the international competition. To be more competent in the Global apparel industries Bangladesh have to maintain standard Supply Chain procedures. If the Bangladesh apparel manufacturing Industry would follow this operation model of raw material which prescribed in this exploratory research then it will be more effective to establish good position in the global apparel market. This paper designates further frontiers for forthcoming researchers as well as practitioners those are involved with apparel manufacturing Industry.

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