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Supply Chain Effectiveness of Clothing Manufacturing Company in Bangladesh

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Abstract- Supply chain management (SCM) is the essential management philosophy and practice of materials, information, and finances where processes flow from supplier to manufacturer to wholesaler to retailer to consumer. This investigative study focus on a conceptual supply chain management (SCM) model for ready-made garments (RMG) industry of Bangladesh. The final goal of SCM is to convey information one group or individual to another. One group or individual should work together with its downstream customers and upstream suppliers to achieve supply chain goal. Communication helps to express employees to conquer their goals without any misinterpretation or misunderstanding. Current circumstances of SCM practice in garments industries have been revealed after questionnaire survey. In this study an endeavor has been taken to widen a more valuable supply chain for Bangladeshi RMG to assistance from competitive advantage in the global apparel business through analyzing the present supply chain and investigating the corelation among the competitors in the supply chain. In analyzing the data for this study, likert's scale used for easy construction of table analysis. Finally some recommendations are provided on the basis of findings.

Keywords: SCM, RMG, managing inventory, planning production, managing distribution, mean and standard deviation.

I. Introduction

A supply chain is a process of procuring raw materials, renovate them into intermediate goods and then final products, and deliver the products to customers through a distribution system [1]. The basic objective of supply chain is to "optimize performance of the chain to add as much value as possible for the least cost possible. In other words, it focus to bond all the supply chain agents to mutually cooperate within the firm as a way to maximize productivity in the supply chain and deliver the most benefits to all related parties [2]. Supply chain effectiveness can be explained as an peripheral standard "of how prominently a group organization is facing the demands of the various groups and organizations that are concerned with its activities through its supply chain" [3] which approximately is a construct "for doing the right things" or having validity of outcome [4]. A conceptualization of effectiveness as use cost is attractive to highlight that how well demands in the above definition is indistinct [5] seem to submit use value to evaluation of the network's utilization of resources. In resource dependence viewpoint is effectiveness seen as an sovereign quantify for evaluating organizations. Meeting demands of various evaluators means that conflicting as well as compatible demands are prevalent [3] predict disagreement when one stakeholder's command constraints other stakeholder's require, which is the case for the supply chain actors. Conflict but also teamwork gives learning in one procedure that is leveraged in other trade processes. Suppliers are effective if they deliver what is asked for, no matter if they are bound to fill their warehouses to supervise, i.e. if they manage the task unproductively. In SCM value is secure with supply chains' elasticity and agility to customer demand. Effective supply chains are strongly integrated with prominent management of existing interdependencies. Even though different researchers give different categories of the processes involved in a supply chain, these processes are somewhat functionally independent and quite similar in that sense. Referred [6] to the underlying business processes as mechanisms and included these processes in a complete supply chain which directly and indirectly impact on effectiveness of supply chain:

1. Forecasting demand on the basis of market research,
2. Placing and receiving customer orders,
3. Managing inventory,
4. Planning production,
5. Communicating between supply chain partners and
6. Managing distribution (shipping)

Forecasting is the basis for all strategic and planning decisions in a supply chain [7] i.e.: production: scheduling, inventory, aggregate planning, and marketing: sales force allocation, promotions, new

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production introduction, and finance: plant/equipment investment, budgetary planning.

Customer order entry technique determines the way and extent to which customer needs are converted into information exchanged along the supply chain. The customer order path is the path that an order traverses is another important measure whereby the time consumed in various channels can be measured. By analyzing the customer order path, non-value adding activities can be identified so that suitable steps can be taken to eliminate them.

Inventory encompasses all the raw materials, work in process, and finished goods within a supply chain. Changing inventory policies can dramatically alter the supply chain's efficiency & effectiveness [7]. If effectiveness is a strategic competitive priority, a firm can locate larger amounts of inventory closer to customers [7]. There are three basic decisions to make regarding the creation and holding of inventory:

Cycle Inventory is the amount of inventory needed to satisfy demand for the product in the period between purchases of the product. Safety Inventory is held as a buffer against uncertainty. If demand forecasting could be done with perfect accuracy, then the only inventory that would be needed would be cycle inventory. Seasonal Inventory is inventory that is built up in anticipation of predictable increases in demand that occur at certain times of the year [7].

Planning the order and goods resources the next step is to make/assemble products. This is the commotion carried out by organizations that own production sites, and their quality has a major impact on product price, excellence, momentum of delivery and delivery consistency, and flexibility [8]. As it is quite a major part of the supply chain, manufacture emphasizes to be measured and continuously enhanced the product. Appropriate metrics for the manufacture level are as follows. Order lead-time, the total order sequence time, called order to delivery cycle time, refers to the time elapsed in between the release of customer order until the delivery of finished goods to the customer. The diminution in order cycle time leads to decrease in supply chain response time, and as such is an essential performance measure and source of spirited advantage [9]. It determines competitiveness directly interacting with customer. According to [8] a plant that manufactures a broad product range is likely to commence new products more slowly than plants with a narrow product range. This clearly suggests that product range affects supply chain performance. Effectiveness of scheduling techniques is another important measure of supply chain effectiveness. Scheduling refers to the time or date on or by which activities are to be undertaken.

To resource flow in an operating system and effectiveness such fixing has an important impact on production and thus supplies chain performance. For example, development techniques of JIT, MRP and ERP have expositing on purchasing of time and batch size.

In case of the supply chain, since scheduling depends heavily on customer demands and supplier performance, the scheduling tools should be viewed in that context [10].

Communication with the supply link is another important measure of supply chain effectiveness. Conventionally supplier performance measures were based on price discrepancy on receipt and on time delivery. For many years, the selection of suppliers and product choice were mainly based on price competition with less attention afforded to other criteria like quality, reliability, etc. More recently, the holistic approaches to evaluating suppliers has undergone drastic change. Managing distribution (shipping) directly impacts on effectiveness on supply chain. Efficiency of delivery performance may increase by reduction in lead time [11]. On-time delivery is another important aspect of delivery performance. Customer service level may measure on time delivery.

A parallel conception, on time order fill, was used by [9], relating it as a combination of delivery consistency and order wholeness. Percentage of finished goods at transit point is significant to increase in tried up capital. Location of depot, vehicle speed, driver reliability and frequency of delivery influence delivery speed. Inventory level may deduce by increase in efficiency in delivery level [12]. Implementation of Supply chain practices in textile and garments sector has slowly increased since the 1980s. A number of methods and techniques are projected and the concept is emancipated from many perspectives. However [13]-[14] explain outstanding review on supply chain management literature on Clothing industry. These papers define the concept, principals, nature, and development of supply chain and indicate that there is an intense research being conducted around the world in this field they critically assessed developments in the theory and practice of supply management. A procedure is an ordered and considered set of activities designed to fabricate a specific output for a particular customer or market [15]. It is holistic approaches within chronological or analogous relationships that cover over a period of time.

II. Key Factors Affecting Supply Chain Effectiveness

According to factory manager Mr. Shafiq Ahmed and merchandising manager Nayeem Hasan of Saba Attires Ltd, it is identified that six factors directly and indirectly impact on effectiveness of supply chain, they are: (1) Forecasting demand (2) Customer orders placement (3) Managing inventory (4) Planning

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production (5) Communication between supply chain members (6) Managing distribution.

a) Forecasting Demand

Forecasting demand is so important as it indicates how other factors will progress in supply chain. Effectiveness in supply chain system can bring on by measuring accurate demand and supplying materials on the basis of demand. By doing this Saba attires Ltd can take the appropriate measure regarding demand forecast and feedback from customers.

b) Circuit Customer Orders Placement

The customer order path is important measurement by which the time spent in different channels can be determined. The time spent in different channels directly effects in supply chain system. Since supply chain of Saba Attires Ltd effectively identify the customer's order from salesman .they can time bound action appropriate for implementing this orders.

c) Managing Inventory

Inventory encompasses all the raw materials, work in process, and finished goods within a supply chain. Saba Attires Ltd has the freedom to change inventory policies can dramatically alter the supply chain's efficiency & effectiveness.

d) Planning Production

The process which associate making confirm that sufficient staffs ready to making product with sufficient raw material to get finished goods in specified schedule time. A manufacturing company must have planning department to maximize efficiency to satisfied consumer. The reduction in order cycle time leads to reduction in supply chain response time, and as such, is an important performance measure and source of competitive advantage.

e) Communication Among Supply Chain Members

Effective communication among supply chain members (such as- suppliers, production managers, merchandisers etc.) impacts in supply chain system because Saba Attires Ltd from mangers to workers are well efficient on performing the supply chain system.

f) Managing Distribution

Distribution system has huge impacts in supply chain effectiveness. On-time delivery reflects whether perfect delivery has taken place or not. Various factors like vehicle speed, driver reliability and location of depots that can influence delivery system and effectiveness of this organizational supply chain system.

III. Data Analysis

In In analyzing the data collected for this study, Likert's Summative Rating scale used in section for easy construction of table analysis and reliability of data. Mean rating will be used to rate the variables. Likert's Summative Rating method of analysis was used in the analysis these research questions.

The assigned weight to the various alternatives is Strongly Agree=5, Agree=4, Neutral=3, Disagree=2 and strong disagree=1.

Mean rating was used for the variables. To get the mean of each table this formula was used

$$Mean = \overline{X} = \frac{\sum X}{\sum f} \quad (1)$$

Where f =frequency of respondent

x=weight assigned to each alternatives

Formula for calculation as used in the reaserch is by multiplication of number of respondents under each option with the weight assigned to the option and summing up to divide by the total number of respondents in order to give the mean rating.

The decision rule is that the mean ($\overline{X}$) of the total response falls –

4.5 to 5.0, it means Supply Chain is -

'Highly Effective'

3.5 to below 4.5, it means Supply Chain is -
'Moderately Effective'

2.5 to below 3.5, it means Supply Chain is -

'Marginally Effective'

2 to below 2.5, it means Supply Chain is -
'Ineffective'

1 to below 2.0, it means Supply Chain is -
'Highly Ineffective'

Standard Deviation is also calculated in order to verify the reliability of data. Standard Deviation less than 1 (SD < 1) is considerd as reliability of data as difference between responses is low.

Table 1: Supply chain operating costs are relevant.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	0	0	0	2.47	0.87
Agree	4	10	10		
Neutral	17	42.5	52.5		
Disagree	13	32.5	85		
Strongly Disagree	6	15	100		

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From table 01, it is found that 10% of the respondents strongly agree and agree that current supply chain operating costs are relevant. The mean rate is 2.47 which fells into range between 2 to below 2.5 which means, it is 'ineffective'.

Table 2: Procurement, manufacturing and delivering stages are able to coordinate to reduce time & cost.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	14	35	35	4.07	0.85
Agree	17	42.5	77.5		
Neutral	7	17.5	95		
Disagree	2	5	100		
Strongly Disagree	0	0	100		

From table 02, it is seen that almost 82% of the respondents strongly agree & agree that current procurement, manufacturing and delivering stages are able to reduce time and cost. Analysis of the above table shows that the mean rate 4.12 that fells into range 3.5 to below 4.5 which indicates that procurement, manufacturing and delivering stages of Saba Attires Ltd are 'moderately effective' to reduce time and cost.

Table 3: Company has cost effective transportation system.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	0	0	0	2.25	0.83
Agree	4	10	10		
Neutral	8	20	30		
Disagree	22	55	85		
Strongly Disagree	6	15	100		

From table 3, it is found that 10% of the respondents strongly agree & agree that Saba Attires Ltd has cost effective transportation system. The mean rate is 2.25 fells into 'ineffective' indicator range which is 2 to below 2.5.

Table 4: The response time of order placement is fast.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	18	45	45	4.27	0.75
Agree	15	37.5	82.5		
Neutral	7	17.5	100		
Disagree	0	0	100		
Strongly Disagree	0	0	100		

From the analysis of the above table it is seen that almost 83% of respondants agree or strongly agree that current supply shain system allows the fast response time of order placement. In this variable the mean rate is 4.27 which indicate that the supply chain of SABA Attires Ltd is 'moderately effective' in terms of order placement.

Table 5: Inventory management department maintains enough inventories to allow uninterrupted production.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	14	35	35	4.12	0.82
Agree	19	47.5	82.5		
Neutral	5	12.5	95		
Disagree	2	5	100		
Strongly Disagree	0	0	100		

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Table 5 implies that almost 78% of respontants agree or strongly agree that Inventory Management Department maintains enough inventory that alows untinturrupted production. The mean rate which is 4.07 ensures that in terms Inventory Management supply chain of SABA Attires Ltd is 'moderately effective'.

Table 6: Order Lead Time of SABA Attires Ltd is good enough compared with the industry average.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	17	42.5	42.5	4.30	0.68
Agree	18	45	87.5		
Neutral	5	12.5	100		
Disagree	0	0	100		
Strongly Disagree	0	0	100		

Table 6 shows that almost 88% of respontants agree or strongly agree that the company's Order Lead Time is good enough compare with the industry's Order Lead Time. The mean rate which is 4.30 indicates that in term of order lead time the supply chain is 'moderately effective'.

Table 7: Suppliers are reliable to supply the right materials to the right place at the right time.

	Number of Respondants (N)	Valid(%)	Cumulative(%)	Mean $\overline{X}$	SD
Strongly Agree	13	32.5	32.5	4.02	0.89
Agree	18	45	77.5		
Neutral	6	15	92.5		
Disagree	3	7.5	100		
Strongly Disagree	0	0	100		

From the analysis of the above table it is seen almost 78% of respondants agree or strongly agree that suppliers are reliable to supply the right materials to the right place at the right time. In this variable the mean rate is 4.02 which indicate that it is 'moderately effective'.

Table 8: Current supply chain management makes communication among supply chain members faster, easier and more frequent.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	21	52.5	52.5	4.50	0.55
Agree	18	45	97.5		
Neutral	1	2.5	100		
Disagree	0	0	100		
Strongly Disagree	0	0	100		

From table 8, it is seen that that 98% of the respondents strongly agree & agree that supply chain management makes better communication among supply chain members. Analysis of the above table shows that the mean rate is 4.50, which fells into range 4.5 to below 5.0. It indicates that the supply chain is highly effective in terms of communication among supply chain members.

Table 9: Company has cost effective warehouse strategies to reduce the cost to maintain inventory.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	0	0	0	3.17	0.71
Agree	14	35	35		
Neutral	19	47.5	82.5		
Disagree	7	17.5	100		
Strongly Disagree	0	0	100		

Table 9 shows that almost 35% of respontants agree and strongly agree that current supply chain has cost effective warehouse strategies to reduce the cost to maintain inventory. The mean rate which is 3.17 indicates that supply chain is 'marginaly effective' in this particuler measure.

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Table 10: Shipments are delivered as per the dateline.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	4	10	10	3.57	0.84
Agree	20	50	60		
Neutral	11	27.5	87.5		
Disagree	5	12.5	100		
Strongly Disagree	0	0	100		

From table 10, it is found that 60% of the respondents strongly agree & agree that shipments are delivered as per the dateline. The mean rate is 3.57 fells into 'moderately effective' indicator range which is 3.5 to below 4.5.

Table 11: Company's supply chain process is consistent enough to meet every departments demand efficiently.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	2	5	5	3.25	0.83
Agree	13	32.5	37.5		
Neutral	19	47.5	85		
Disagree	5	12.5	97.5		
Strongly Disagree	1	2.5	100		

From table 11, it is found that almost 38% of the respondents strongly agree & agree that Current supply chain process is consistent enough to meet every departments demand efficiently. The mean rate is 3.25 fells into 'marginally effective' indicator range which is 2.5 to below 3.5.

Table 12: The shipping department determines the most efficient method to ship the products in time.

	Number of Respondants (N)	Valid (%)	Cumulative (%)	Mean $\overline{X}$	SD
Strongly Agree	7	17.5	17.5	3.82	0.84
Agree	23	57.5	75		
Neutral	6	15	90		
Disagree	4	10	100		
Strongly Disagree	0	0	100		

From table 12, it is found that 75% of the respondents strongly agree & agree that the shipping department determines the most efficient method to ship the products in time. The mean rate is 3.82 fells into 'moderately effective' indicator range which is 3.5 to below 4.5.

IV. Finding

1. In term of operating costs, the supply chain of Saba Attires Ltd is ineffective.
2. Procurement, manufacturing and delivering stages of Saba Attires Ltd are moderately effective to reduce time and cost.
3. In term of cost effective transportation system, Saba Attires Ltd is ineffective
4. Supply chain is moderately effective in case of response time of order placement.
5. Supply chain is moderately effective in term of untinturrupted production.
6. In term of order lead time, the supply chain of Saba Attires Ltd is moderately effective.
7. Suppliers are reliable to supply the right materials to the right place at the right time is moderately effective.
8. In term of communication with supply chain members, supply chain is highly effective.
9. Supply chain of Saba Attires Ltd is marginaly effective in term of cost effective warehouse strategies to reduce the cost to maintain inventory.
10. Supply chain is moderately effective in term of shipment delivery.
11. In term of consistency to meet every departments demand efficiently, supply chain is marginaly effective.

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12. In case of the most efficient method to ship the products in time, Saba Attires Ltd is moderately effective.

V. Conclusion

Supply chains are efficient when the exchange value of the system fulfills desire of the supply chain members. . The study finds that in some supply areas like - price forecasting system, inventory; supply chain of Saba Attires Ltd is ineffective or marginally effective. In terms of order placement, communication, production management; supply chain is highly and moderately effective. The modern business is characterized with shorter product life cycles, rapid new product introductions, increasingly knowledgeable, well informed, and sophisticated customers. This forces supply chains to be more effective. The modern supply chains are thus expected to respond rapidly, effectively, and efficiently to changes in the market place so as to sustain, and further more create competitive advantage. It is therefore very important to study the effectiveness of supply chains.

VI. Recomendation

Saba Attires Ltd should improve their supply chain practice in those areas in which are current ineffective or marginally effective.

Operating costing system of Saba Attires Ltd is ineffective. Supply chain operating costs are under pressure today from rising shipment prices, more global customers, rising labor rates and rising commodity prices.

- Operating costing system of Saba Attires Ltd is ineffective. Supply chain operating costs are under pressure today from rising freight prices, more global customers, rising labor rates and rising commodity prices. If operating costs are not accurately predicted, the cost will be increased as consequence. So, price forecasting system of all relevent arenas should be improved.
- Transportation system should be improved as the study finds that this function is currently in ineffective level. Although currently distribution shedule is not hampering that much as study shows but it can seriously impacts on production and distribution. Transportation system can be improved by using better vehicles.
- Saba Attires Ltd should improved warehouse facilities by making more warehouses nearer to the factory which will reduce cost as well as time.

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