

A study on the Measures taken to sustain the flexibility of a global supply chain during the Pandemic

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Abstract

During the pandemic era, one of the most impacted sectors was the supply chain. The pandemic has been a prominent phenomenon and it will take a while to get back to normal life, the demand for daily needs and necessities never dropped. This study aims to present how pandemics impacted a global supply chain by restraining the flexibility of the supply chain. The data were collected from a reputed Global retail supplier the supplied goods are largely textile-based finished goods. The study presents what were the main areas where pandemics hit the most and what steps and modifications were applied to find a solution to lessen the damage and survive during the pandemics. The data were collected directly from the company. And due to some privacy issues and license criteria, the company name can't be revealed in the study. SPSS, G-suite and Microsoft Office were used during the study to analyze and present the data.

Keywords

Supply chain, Pandemic, Flexible, Global and Sustainability.

1. Introduction

During the pandemic beginning, it was a common and shocking scenario to see Billion-dollar industries falling down within a very short time. The factors were many but the major difficulty was the disrupted supply chain. Bangladesh is one of the giants in the global garments industry and has experienced several difficulties during the Covid-19 pandemic. Since the worldwide outbreak of COVID-19, the Bangladesh RMG supply chain has become prone to disruption due to the raw material shortage from China, Buyers' financial crisis, Sudden cancellation of orders, and unprecedented decrease in demand. If the whole chain is looked at a glance, it is visible that during the pandemic the priorities for clothes and textile-based goods have been less for the mass and thus the global textile brands had to repilot their business, decrease the orders and some cases, they had to close their operations in different countries due to bankruptcy.

The RMG industry contributed USD34.13 billion to Bangladesh's export earnings in 2018–19, representing 84.21% of the total exports and demonstrating the sector's importance for the country's economic survivability [BGMEA (2020)] However, due to the current COVID-19 pandemic, export growth declined by 18.12% in 2019–20 compared to the previous year, and further decreased by 1.2% in the first four months (July–October) in 2020–21 compared to

the same period in 2019–20 (BGMEA 2020a). Different Buyer order cancellation has increased since the pandemic started. By September 2020, USD 3.18 billion in exports were canceled, which affected the livelihood of 2.28 million workers (BGMEA 2020b). In this study, considering the impact of this global context, one global chain retailer has radically changed its supply chain and management strategy to avoid severe financial loss and at the same time, it was able to uphold customer satisfaction. Ashraf, H. and Prentice, R. (2019)

This study is based on year-long data from a Top Global Retailer. The global retailer work methodology and different terms are well explained in the next chapters. The next section presents the backdrop of the study, the design process of the procedures that were taken for survival during the pandemic, data collection and analysis. Section 3 presents the data calculation, and Section 4 discusses the results of the study. Finally, Section 5 summarizes the study with the limitations that were faced and future aspects of this study

2. Methodology

For the purpose of this study, real-life data were taken from 5 RMG factories which have a contribution of 200 million USD business in the global retail supplier. The global retail supplier has 10 years of the business relationship in Bangladesh. And had steady growth from 2010 until 2020. The sudden outbreak of COVID-19 completely changed the business trend within a very short period of time. To tackle this unwanted scenario, the Global retailer took several innovative decisions.

Several terms are very specific, and in order to better understand these terms will be explained. And an overall data analysis will be presented to justify the action that was taken.

The Global retail supplier works based on the below flowchart, here the flowchart shows the order cycle from the need being put in the system and the products being delivered to the customers

The lines here show the physical flow

The dotted lines show the information flow

The sales data that are extracted from the day-to-day purchase of different products through shops and e-commerce websites are integrated with AI and previous year sales data trends. And finally, a Retail supplier concern analyzes the data and puts the need through orders in different RMG factories. For a complete understanding, some of the terms are explained below

CHD is the short form of contractual handover date, it is the agreed date between the supplier and the Global retailer, this date indicates the date of handing over the goods from Bangladesh.

The finished goods are dispatched from CTG sea port to Europe. The main transport mode is via Ship. Here another term is introduced and that is called CDD. CDD implicates the Contractual delivery date. The CDD is the date when the orders reach the continental warehouse. From the continental warehouse, the orders are distributed to regional warehouses. This whole flow initiates from the analyzed data that is collected from real-time purchase data from the end customers. The AI integrates real-time data with previous years' sales history (Figure 1).

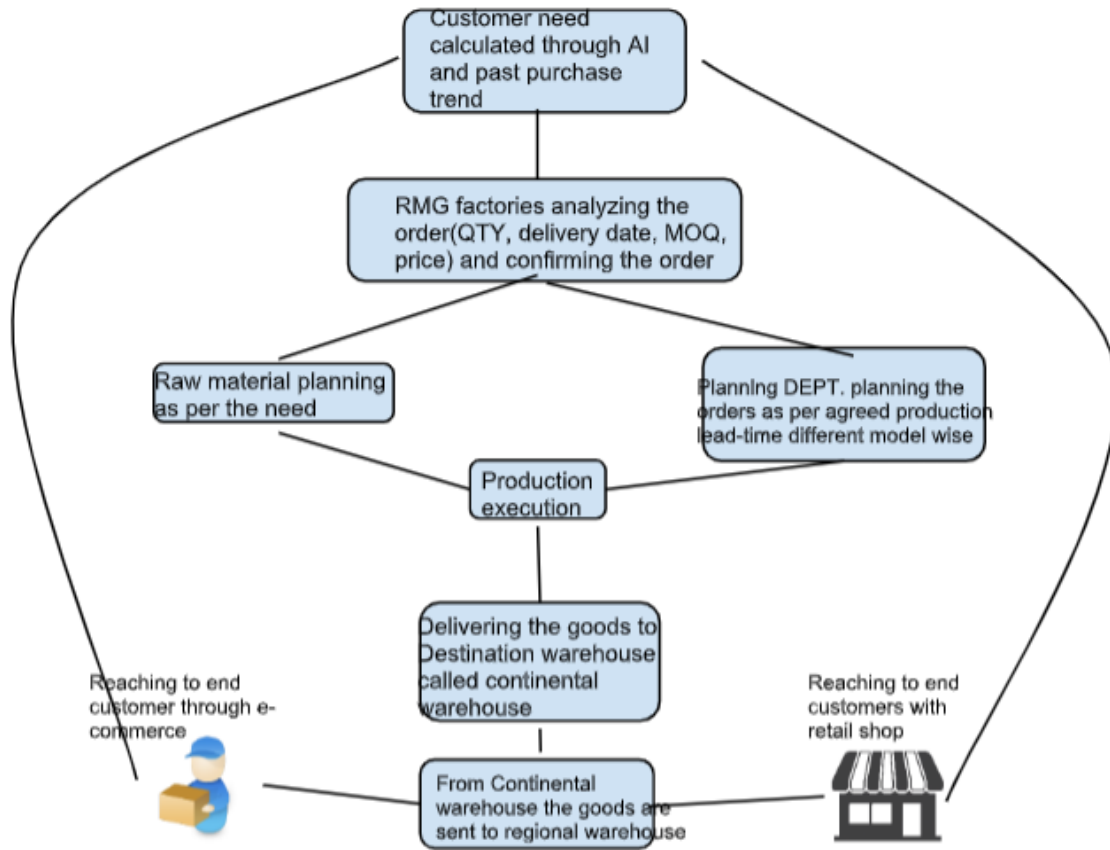


Figure 1. Supply chain basic information and Physical goods flow

2.1 Data Collection

The data were collected from the main database of the global retail supplier. SAP is used to collect and communicate through different mediums. The finished goods are mostly textiles based, the data that are collected are from March 2020 to March 2021. This year's long data analysis helps to show the effectiveness of the steps that were taken to sustain the supply chain.

Initially, these data were taken for 100 models, here the model defines different styles of finished goods. The textile finished goods are T-shirts, Jackets and leggings. For privacy purposes, details of the finished goods are not discussed here.

2.2 Working Procedure

The Global retail supplier ensures the on-time handover of finished goods by giving earlier raw material commitments to the RMG factory. In this way, the RMG factories can ensure the different raw materials, such as fabric, care labels, threads, RFID tags etc. Especially the raw materials which are produced and sourced from China. In these raw materials are bought in advance to ensure the smooth flow of the supply chain. However, the outbreak of the pandemic created a massive shift in customers' needs as people were in a situation where the need for medicines and basic needs was more than ever. Thus, the already placed orders were in the face of cancellation and at the same time, the materials were in different stages and different warehouses. The below chart (Figure 2) shares clarity on the situation, the chart denotes the flowchart while indicating the two paths, one, if the firm order is cancelled, and another if the order is not cancelled. Mahfouz, A, Shea, J, and Arisha, A (2011)

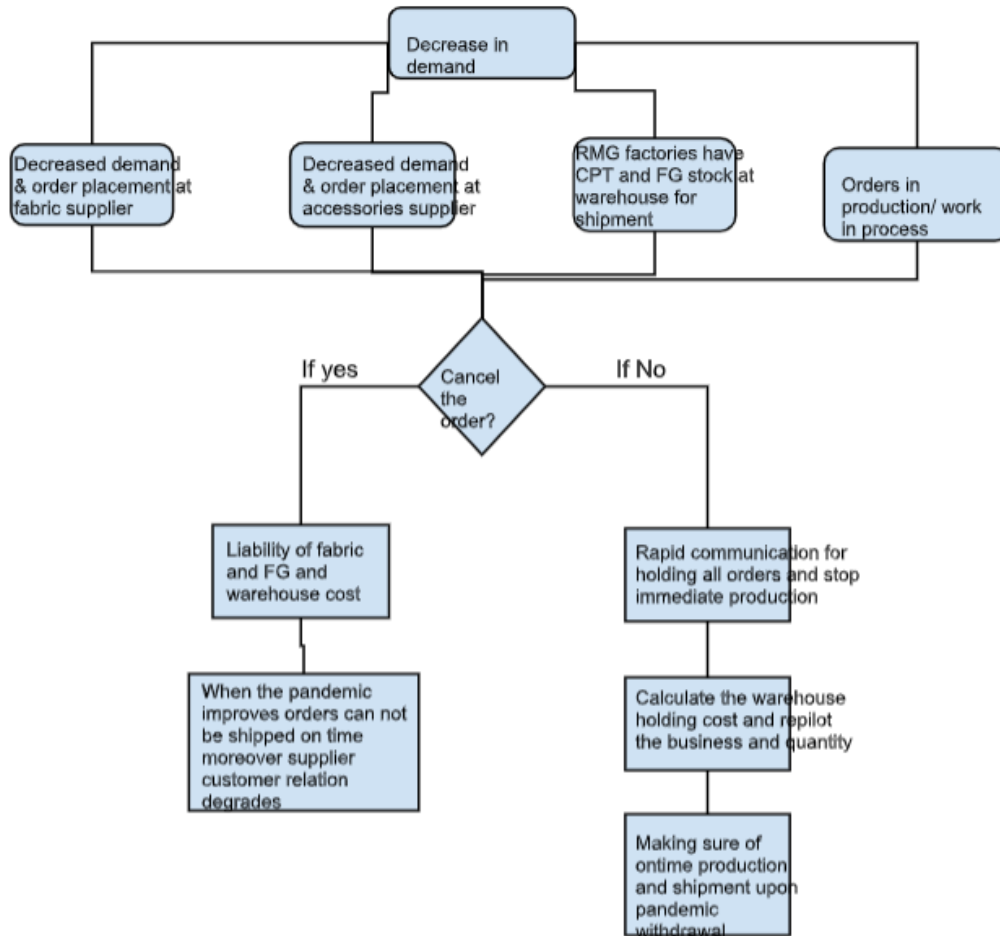


Figure 2. The flowchart shows the cascading effect of demand decrease

2.3 Data Collection and Analysis

The database related to orders and different RMG factory data; all are stored in the SAP. From SAP data were collected and analyzed via Microsoft office. The data that were taken are the primary and raw data that are shared between the retail and factories.

Here the data collections and analysis were different for the MTO (make-to-order) and MTS (make-to-stock models). The MTO models (finished goods) are the models that have a regular demand and are not selected as a crucial business for the company whereas the MTS models are the models that are crucial for the company and at the same time, they bring a lot more revenue. Halawa, F., Lee, I.G., Shen, W., Khan, M.E. and Nagarur, N., 2017

For 80 MTO models the data analysis are given below in Figure 3, here the models are divided by product type, and the model description could not be shared for company security purpose,

Trend lines among 3 timelines

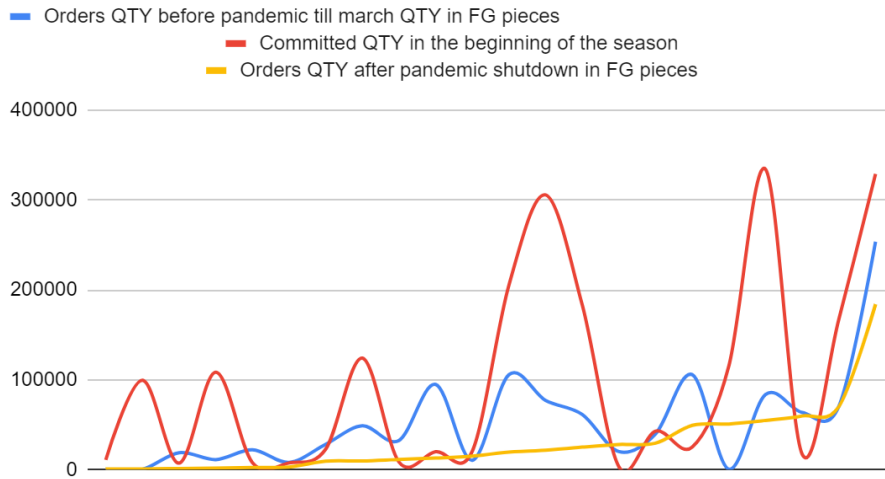


Figure 3. Figure shows the decreasing demand for 80 models (MTO)

SUM of Orders QTY after pandemic shutdown in FG pieces, SUM of Orders QTY before pandemic till march QTY in FG pieces and SUM of Committed QTY in the beginning of the season

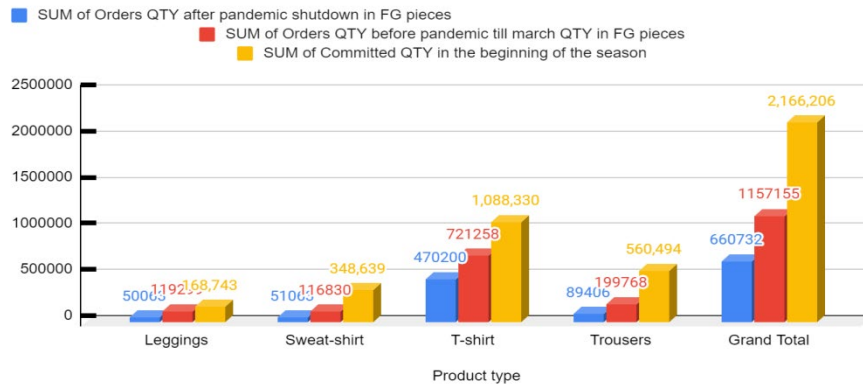


Figure 4. The QTY differences as per product type (MTO)

If these two graphs are studied it clearly shows how different the Demand decreased over time for the MTO models it can be seen in the figure 4 some models started to do great business beyond the committed QTY; however, it got drastically decreased after pandemic shutdown, the scenario is same for one MTO models with a business over 330K Pcs.

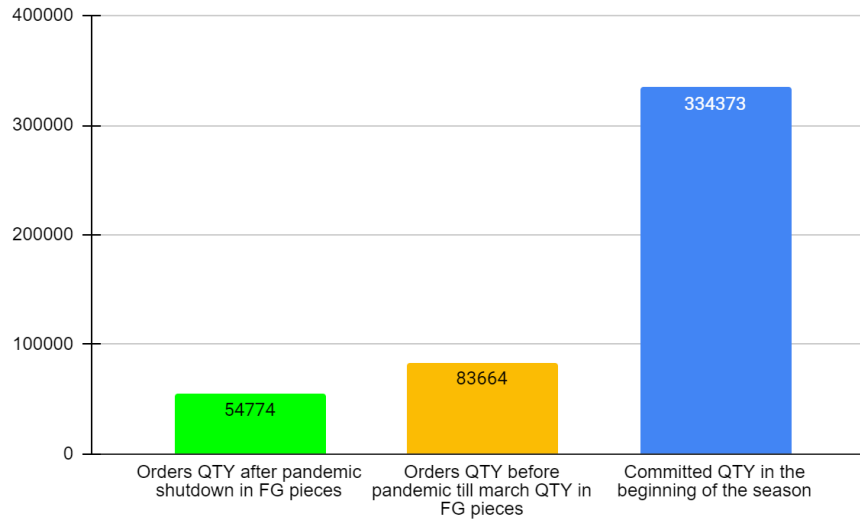


Figure 5. The QTY differences as per product type (MTS)

The idea of make-to-stock is to produce the goods before the firm orders are placed in the system, the MTS model is a trouser and there is a size-wise QTY that is planned to produce every week (Figure 5).

3. Calculation

For the MTO models the fabrics are not fully bought in advance, mostly they are bought 50%. The dyed fabric is bought and shipped 50% and the rest 50% is taken as per demand, in this way the Global retail supplier doesn't have to take the full liability of the fabric. If the fabric need is calculated product type wise and import/local fabric supplier wise in Figures 6 and 7.

Product type	SUM of Fabric bought in KG	SUM of Fabric bought in advanced 50%(KG)
Leggings	37902.955	18951.4775
Sweat-shirt	117904.758	58952.379
T-Shirt	155368.432	77684.216
Trousers	234883.232	117441.616
Grand Total	546059.377	273029.6885

Figure 6. Chart for import Fabric qty that was bought

Product type	SUM of Fabric bought in KG	SUM of Fabric bought in advanced 50%(KG)
T-shirt	90726.128	45363.064
Grand Total	90726.128	45363.064

Figure 7. Chart for local fabricity that was bought

For MTS models as the production is done based on the forecast not fully on the firm order the fabric has to be bought in full QTY, that is why the risk prevails the most for this MTS.

But in this case, the production planning has been dynamically shifted to meet the decreased demand scenario, the production planning week-wise for week 01 to week 32 is given below in Figure 8.

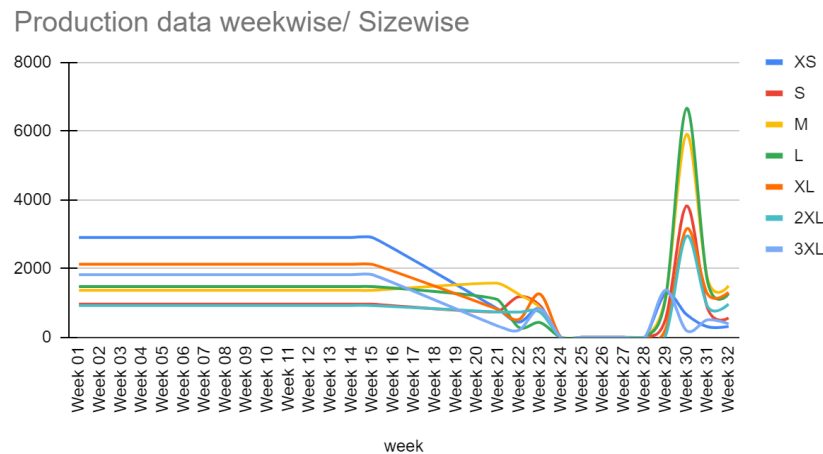


Figure 8. The chart shows the production was decreased and then stopped and finally increased to meet the fluctuating demand

4. Result and Discussions

The global retail supplier works on real-time forecasts and AI data management. To tackle such an unprecedented decrease in demand, below drastic steps were taken. The main raw material is fabric. Fabric suppliers are of two types local and Import. The import fabric supplier is China. 17% of the total fabric is from Bangladesh. For raw material production the main instructions during the pandemic were

- Stop production immediately as communicated
- Hold the fabric in the warehouse Retail supplier will pay the warehouse holding cost
- For the most important fabric several machines should be running in case of sudden demand rise
- for local fabric as the lead time is short and no risk of high stock as the fabric is not produced in advanced they are produced in JIT(just in time), most of the productions were in the hold
- For the MTS model as the fabrics are already in-house, the production planning had to be shifted to meet the decreased demand.
- And also the business forecast was re-piloted so that the raw materials and future planning are minimized.

The main strong point that played a pivotal role is not to depend totally on firm orders. Unlike other big buyers, this global retail supplier works on the forecast and firm orders mixed. That is why even when the pandemic shutdown occurred it could survive as not all the QTY were tied to orders. The full study establishes how the demand dropped and also the company's strategies to cope with the situation.

It is inevitable that some firm orders had to be canceled from the retail supplier side, but the percentage is 22% of the total order, also for this order the retail supplier paid the RMG factories full liabilities. Thus the global retail supplier could retain their business and survive during the disrupted supply chain period.

5. Conclusion

The study could have been expanded with more models and more months of data, however, due to security and privacy issues more data could not be collected. next further studies can be made with the dependency on forecast data vs the realized data. And during the pandemic outbreak, a detailed analysis of inventory management can also be shown.

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Biography

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