# Course Project Part 2-EXECUTIVE SUMMARY

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# Executive summary

Our course project is based on a case study Building the supply chain for Covid-19 vaccines. In phase 1 of the case study, we tried to explain what COVID-19 was and how it impacted the supply chain of the world. Now in phase II, our goal is to work with the COVID-19 dataset and create insights, stories, and visualizations of the dataset and create forecasts for them.

Starting with the background of the company that was building the supply chain for the vaccine. MediCrystal is a leading German pharmaceutical glass manufacturing company that offers a solution for a whole range of basic volume tubular glass parenteral packaging, including ampoules, vials, cartridges, and sterile pre-fillable syringes. The company has manufacturing plants in South Asia, America, and Europe. They have customer all over the world and supplies their products to over 120 countries.

Now due to COVID-19, as we know there has been a large production of vaccination for the treatment of COVID, the company has signed an agreement with major pharmaceutical firms to supply pharma glass products for the packaging of 2 billion doses of covid vaccine. However, now the issue is that due to a sudden increase in the demand for glass, the company is facing issues in the supply chain of production and other small or local companies are also facing the same issue. Due to COVID-19, they are facing issues. The demand is also unpredictable and there are concerns related to shortage and stockout. Now, we being a members of the team are given excel data to basically get the insights and work on it using different visualizations.

The excel data on the Medicrystal case study is given to us that provides clarity on the support and situation of Medicrystal on which the solutions should be formed. Moreover, the excel data provided contain exhibits that provide different insights of the company and focus on 3 main areas that are **Supplier risk, Inventory SKU Data and Capacity constraints**. Firstly, talking about supplier risk. It is any risk that is associated with the organization or its operations that can impact the activities of the client company in a negative way. The second main area is Inventory SKU Data. SKU means Stock-keeping unit. Inventory SKU data means monitoring and analyzing the SKU level. The SKU mainly has a barcode on the product label that is scannable. The inventory SKU Data uses that barcode to manage and analyze the data that helps them to make decisions accordingly. The 3rd main area discussed in this excel is the capacity constraints. Capacity constraints are a rule that administers the number of items that can be given to a supplier. These 3 areas are an important part of the supply chain and need to be considered by both the supply chain professionals and the companies.

There are also different attributes taken into consideration to help identify the supplier who poses the greater risk and those are **Regulatory risk, Financial risk, Data security and Supplier related risk.**

Moving on, in this excel 4 data exhibits are given in total and we will do visualization using these 4 exhibits. The Data Exhibit 1 contains the data about the Medi Crystal supplier that is collected by their Risk compliance team. The sheet contains different variables that can be used to draw assumptions and conclusions. It provides the name of the supplier and the location of the supplier warehouse from where the product will be supplied to Medi Crystal. Then it shows the revenue and the cash from operations. These are a very important part of a company. Other than there are more variables that show their out-of-delivery time, credit rating, environmental incidents, and data security. To draw conclusions from this, I tried to make 1 tableau dashboard containing 2 sheets. In the **first sheet shown in figure 1 below**, I have taken the supplier’s name and their cash from operations. This will help the company to see how much cash from operations they are earning from different suppliers and based on it they can change their supplier. Like in this case, if we see figure 1, Real glass suppliers give the most cash from operations so the company can appoint them as their main supplier. With the help of this visualization, the company can make capacity-constraint decisions. The **second sheet in Figure 1**, I have made a combination of the supplier’s name, their OTD (out-to-delivery time), and revenue. The purpose of using these variables was to see the revenue of different suppliers and their delivery time. This is a very useful resource as from this we can see which supplier is making the most revenue and what is their delivery time. Accordingly, the decision can be made that which supplier is the best.

The Data Exhibit 2 sheet contains data about the inventory at GlasWork. There are different columns in the sheet that describe the SKU information of Glaswork. It includes lead time, price of SKU, total stock on-hand of Glaswork, Average monthly consumption, and demand variability. This will help us to make assumptions and decisions for the business. In our case, I have developed a dashboard for exhibit 2 using 2 sheets. In **sheet 1 Figure 2** I have tried to compare Data Variability with On-time delivery performance within the past 12 months. It shows the data variability and on-time delivery performance of different products. If we see some of the SKUs that are on the higher side, it shows there is a lot of demand variability for them along with high supplier on-time delivery. So, these are risky products, but they come on time. The **second sheet in figure 2 contains** SKU and its lead time. Lead time is basically the days to procure the SKU and SKU shows the number. In our case, I used lead time and SKU with its price on average. It shows how lead time a specific SKU takes along with its average price. An example of this can be seen as SKU 68,001 number takes 290 days and its average price is $24. This will help the company to make a decision that which SKUs to re-order beforehand according to their lead time and the price will help them to see which SKUs give more profit/ earnings.

Now, coming to Data Exhibit 3. It contains 4 different tables with data related to the demand for the products from fabricadas. Moreover, demand projections are given for 4 quarters of 2020 and 2021 which show the manufacturing of each product in a single quarter. I have designed the demand projections for 4 quarters that can be seen in **sheet 1 of figure 3** mentioned below. This will help to know the demand projection for Ampoules, syringes, and vials in different quarters. This basically shows the changes between the products. Other than this, **sheet 2 of figure 3** shows the cycle time for each product in the number of hours for each lot. It also shows the breakup according to the processing time. We can see an example here that packaging takes 24 hours of process time for all three products i.e Ampoules, Vials, and syringes and vials take the second most time in the washing line. The final sheet shows a net lot of equivalents rejected in a quarter by Fabricadas. In this, we can see that the contamination rejects are the highest. It is averaged from the previous data. we can see that syringes have the most bend tubing rejects and Ampoules has the most glass breakages. This will help companies to make changes and improvements according to the data.

Lastly, data exhibit 4 shows the 4-step manufacturing process for all 3 products in the fabricadas. It shows that the process starts with the Glass Tubing unit. Then the product goes to the hot-forming process unit which creates the required shape of the product. After this, products are moved for washing and inspection unit. Once the inspection is done then the products are ready to be packed and distributed into the market. Each plant manufactures 3 products which are mentioned above also that are Ampoules, Tubular Vials, and Glass syringes. As we can see in the diagram also, each product has its own separate movement. It is important to note that for one plant only one product can undergo the process at a time. To have a good and strong supply chain network, it is very important to understand the manufacturing process, because the supply chain depends on it. If the product is produced late in any of the stages it will directly impact its supply chain.

These all are different visualizations that can be made from the data given. This is not enough and many other parameters can be used so this needs an in-depth analysis for a company to make conclusions work on it accordingly.

Chart, bar chart

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Figure 1: Supplier Name Vs S-OTD Vs Cash from operations

Chart, scatter chart

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Figure2: Demand Variability Vs S-OTD and Lead Time Vs SKU

Graphical user interface, bar chart

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Figure3: Demand Projection Quarter wise/Cycle Time Stage Wise and Net lot equivalent rejections

Diagram

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