**Introduction:**

Supply Chain plays a crucial role to certify the smooth movement of good and services across global markets. The timely delivery of shipments, however, can be greatly impacted by unanticipated events like natural disasters, labor disputes, or transportation interruptions, which can cause disruptions and financial losses for organizations. In order to increase supply chains' resilience, it is crucial to proactively analyze and manage potential risks. This research paper aims to investigate with the help of a machine learning (ML) algorithm and Monte Carlo simulation, the consequences of unexpected events on the likelihood that shipments will arrive at their destinations on time. This study aims to provide insights into improving supply chain management practices, empowering organizations to make wise decisions for risk mitigation and operational optimization. We have utilized the extensive DataCo Smart Supply Chain dataset gathered via Kaggle for the purpose of above examination.

To fulfil the rising needs of a dynamic marketplace, the global economy significantly relies on effective supply chain networks. However, because of their interconnection and complexity, supply chain networks are susceptible to a number of risks that could impair their performance. The majority of traditional supply chain risk management strategies have been reactive in nature, addressing disruptions after they happen. For organizations to maintain competitive advantages and guarantee consumer satisfaction, the capacity to foresee and manage these risks is essential. Therefore, in this research we cover a wide range of supply chain components like “**Order Item Profit Ratio**”, “**Sales per customer**”, “**Benefit per order**”, “**Late Delivery Risk**”, and others, that measure the profitability and all possible risks that may disrupt the supply chain cycle. By assembling this dataset with Monte Carlo simulation and a ML algorithm, we can proactively forecast the probability of shipments and how the power of Machine Learning is impacting the SCM area.