

Supply chain risk identification through text-mining approach

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Abstract

Supply Chain Risk Management (SCRM) is a rapidly growing field of research encompassing identification, assessment, mitigation, and monitoring of the risks or unexpected and unprecedented events. There has been a significant focus on identifying, mitigating, and managing the risks that affect the supply chain (SC). Though the research on SCRM remains for an extended period, still the industries are facing difficulties in managing the SC risks. Also, the SC managers have begun to focus on decision-making based on numerous data sources for predicting the uncertainties more accurately to achieve a proactive and predictive intelligent risk management mechanism.

The global pandemic COVID-19 unveils the transformation of the SC to be more resilient, visible, and responsive against unprecedented events due to the complex environments. Risk identification and assessment provide the decisions regarding the development of mitigation strategies. The earlier risk quantification methods make timely decision-making more complex due to their inability to provide early warning. The efficient risk management mechanism begins with understanding the various sources and consequences of SC risks to identify the critical threats that should be treated. Since these potential risk factors impact SC performance, the accuracy of risk identification plays a vital role in developing mitigation strategies. For example, the COVID-19 pandemic has driven the importance to identify the potential risks from very recent information to achieve accurate decisions. Hence, discovering the risk factors that disrupt SC in real-time is one of the most significant stages in the risk management process.

Nowadays, the general public can also assess the abundance of such information through open databases such as Google News and Yahoo News. Hence, this investigation attempts to analyze how this unstructured textual information related to risks can be converted into valuable insights using the potential of data mining techniques to identify SC risks. For example, currently, Twitter is the most popular online service which enables the public to communicate information related to any topic consisting of limited characters. Therefore, we exploit the potential of text-mining, one of the most popular Artificial Intelligence (AI) based data analytics approaches for extracting information from social media. The model retrieves the information using Twitter streaming API from online SC forums like '*Supply Chain Dive*', '*Supply Chain Brain*', '*Supply Chain Digest*'. The potential risk factors that disrupt SC performance are obtained from the recent data by text-mining analyses. The outcomes carry valuable insights about some contemporary SC issues such as semiconductor shortages, port congestion, and increase in lead time due to the pandemic during the year 2021. We also analyze the most frequent risk factors using rule mining techniques. Future research will extend to represent a digital twin for identifying potential risks through social media analytics, assessing risk propagation, and obtaining mitigation strategies.