



STRATHMORE UNIVERSITY BUSINESS SCHOOL
BACHELOR OF SCIENCE IN SUPPLY CHAIN AND OPERATIONS MANAGEMENT
END OF SEMESTER EXAMINATION
BSC 4106 SUPPLY CHAIN INTELLIGENCE AND DATA ANALYTICS

DATE: Friday, 28th July 2023

Time: 2 Hours

Instructions

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

Question One:

(Total 30 marks)

- a) Distinguish between the following terms in the context of supply chain intelligence and data analytics.
 - i). Online Analytical processing and Online Transactional processing. **(3 marks)**
 - ii). Text analytics and text mining. **(2 marks)**
 - iii). Data mining and sentiment analytics. **(3 marks)**
 - iv). Supervised and unsupervised machine learning. **(3 marks)**
- b) Implementing Supply chain intelligence and data analytics in the environment today is considered crucial by many commentators. However, they argue that it is not a straightforward affair and has many challenges.
 - i). Discuss three challenges associated with implementing supply chain intelligence and data analytics in an organization. **(5 marks)**
 - ii). Explain any two ways that these challenges may be addressed to ensure successful implementation. **(4 marks)**
- c) Compare and contrast descriptive, predictive, and prescriptive analytics in the context of supply chain intelligence. Provide examples of how each type of analytics can be applied to solve different supply chain challenges. **(10 marks)**

Question Two (Total 15 marks)

Data visualization plays a crucial role in supply chain intelligence, though it has been in use for many years, it has only recently been deployed in supply chain intelligence.

Required:

Discuss how effective data visualization techniques may help decision-makers understand complex supply chain data and identify patterns and trends in support of supply chain intelligence.

Question Three (15 Marks)

Discuss how any two emerging technologies such as blockchain, Internet of Things (IoT), and big data have impacted on supply chain intelligence using practical examples.

Question Four (15 Marks)

Read the case below and answer the questions that follow.

American Airlines, Inc. (AA) is one of the world's largest airlines. Its core business is passenger transportation, but it has other vital ancillary functions that include full-truckload (FTL) freight shipment of maintenance equipment and in-flight shipment of passenger service items that could add up to over \$1 billion in inventory at any given time. AA receives numerous bids from suppliers in response to requests for quotes (RFQs) for inventories. AA's RFQs could total over 500 in any given year. Bid quotes vary significantly as a result of the large number of bids and resultant complex bidding process. Sometimes, a single contract bid could deviate by about 200%. As a result of the complex process, it is common to either overpay or underpay suppliers for their services. To this end, AA wanted a should-cost model that would streamline and assess bid quotes from suppliers to choose bid quotes that were fair to both them and their suppliers.

Methodology/Solution

To determine fair cost for supplier products and services, three steps were taken:

- Primary (e.g., interviews) and secondary (e.g., Internet) sources were scouted for base-case and range data that would inform cost variables that affect an FTL bid.
- Cost variables were chosen so that they were mutually exclusive and collectively exhaustive.
- The DPL decision analysis software was used to model the uncertainty.

Furthermore, Extended Swanson-Megill approximation was used to model the probability distribution of the most sensitive cost variables used. This was done to account for the high variability in the bids in the initial model.

Results/Benefits

A pilot test was done on an RFQ that attracted bids from six FTL carriers. Out of the six bids presented, five were within three standard deviations from the mean, whereas one was considered an outlier. Subsequently, AA used the should-cost FTL model on more than 20 RFQs to determine what a fair and accurate cost of goods and services should be. It is expected that this model will help in reducing the risk of either overpaying or underpaying its suppliers.

Source: Based on Bailey, M. J., Snapp, J., Yetur, S., Stonebraker, J. S., Edwards, S. A., Davis, A., & Cox, R. (2011). Practice summaries: American Airlines uses should-cost modelling to assess the uncertainty of bids for its full-truckload shipment routes. *Interfaces*, 41(2), 194–196

Required:

- a) Besides reducing the risk of overpaying or underpaying suppliers, what are some other benefits AA would derive from its "should-be" model?
- b) Can you think of other domains besides air transportation where such a model could be used?
- c) Discuss other possible methods with which AA could have solved its bid overpayment and underpayment problem.

Question five (15 Marks)

Supply chain intelligence and data analytics is considered one of the areas that potentially can give rise to collection and utilisation of information that some may consider private and invasive though many organisations feel it is fair if the user does not object. There are also those data collection and use practises that are outright unethical and even illegal practices.

Required:

- a) Explain any three ethical considerations that need to be considered when collecting, analysing, and using supply chain data for intelligence purposes. Give practical examples for each. **(8 marks)**
- b) Discuss any two potential ethical dilemmas related to collection analysis and use of supply chain data for intelligence purposes and strategies to address them. **(7marks)**