Badger Diploma Company: Shipping & Logistics Optimization

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Abstract Shipping and logistics optimization is a fundamental operation in the supply chain of any business. Shipping and logistics optimization is a fundamental operation in the supply chain of any business. This project presents an Enterprise Badger Diploma Company, which is trying to optimize its shipping and logistics operations. Badger Diploma Company is a fictitious company that manufacturers diplomas for universities and colleges. Badger Diploma Company has different customers, one of which is a transshipment problem and another is a multi-period planning problem. The general structure for each problem is provided, and a mathematical model is developed for each problem. Each mathematical model is implemented in the algebraic modeling language GNU MathProg and solved using the GLPK solver. Sensitivity analysis is also performed on the transshipment problem, and the results are presented and discussed. The sensitivity analysis includes changes in demand, the network structure, and capacity constraints. Finally, the model is run with these changes and the results are discussed.

1. Introduction

1.1 Project Overview

The following Badger Diploma Company project represents the Enterprise Badger Diploma Company, which is trying to optimize its shipping and logistics operations. Badger Diploma Company is a fictitious company that manufactures diplomas for universities and colleges. Badger Diploma Company has different customers, one of which is a transshipment problem and another is a multi-period planning problem. The general structure for each problem is provided, and a mathematical model is developed for each problem. Each mathematical model is implemented in the algebraic modeling language GNU MathProg and solved using the GLPK solver. Sensitivity analysis is also performed on the transshipment problem, and the results are presented and discussed. The sensitivity analysis includes changes in demand, the network structure, and capacity constraints. Finally, the model is run with these changes and the results are discussed.

1.2 Transportation, Shipping and Logistics

1.2.1 Shipping and Logistics

Shipping and logistics operations (shipping or logistics) is the US term continued to grow in the realm of the online retail boom caused by the COVID pandemic. The Long Beach Port's Shipping Crisis measure growth and demand. Retail sales growth and demand for business to business, business to consumer, consumer to business, and consumer to consumer transported shipments weighing up to 70 pounds above 75 countries, according to Pitney Bowes Parcel Shipping Index, increased 19% in 2020 versus 2019. Retail sales growth and demand for business to business, business to consumer, consumer to business, and consumer to consumer transported shipments weighing up to 70 pounds above 75 countries, according to Pitney Bowes Parcel Shipping Index, increased 19% in 2020 versus 2019. The pandemic has also created a shift in the demand for different types of goods. For instance, the US saw a 20 percent increase in demand for furniture, office supplies, and supply chain management companies collectively rolling in the up 20% for the year. Furniture, office supplies, and supply chain management companies collectively rolling in the up 20% for the year. Furniture, office supplies, and supply chain management companies collectively rolling in the up 20% for the year. Furniture, office supplies, and supply chain management companies collectively rolling in the up 20% for the year. The pandemic has also created a shift in the demand for different types of goods. For instance, the US saw a 20 percent increase in demand for furniture, office supplies, and supply chain management companies collectively rolling in the up 20% for the year. Furniture, office supplies, and supply chain management companies collectively rolling in the up 20% for the year. The US saw 21.5 billion, 28.5 billion, respectively, USPS UPS and FedEx, 21.6 billion the current data recorded, the most recent data recorded, the most recent data recorded, the most recent

```
# Calculate the Gini coefficient
def gini(x):
    # Calculation of the cumulative distribution function
    xs = np.sort(x)
    n = len(x)
    cum_x = np.cumsum(xs)
    return (n + 1 - 2 * np.sum(cum_x) / cum_x[-1]) / n

# Load the data from the file
df = pd.read_csv('income.csv')
df['Income'] = df['Income'].str.replace('$', '').str.replace(',', '').astype(int)

# Calculate the Gini coefficient for each year
ginis = df.groupby('Year')['Income'].apply(gini)

# Print the Gini coefficients
print('Gini coefficients:')
print(ginis)

# Plot the Gini coefficients over time
plt.plot(ginis.index, ginis.values)
plt.xlabel('Year')
plt.ylabel('Gini coefficient')
plt.title('Gini coefficients over time')
plt.show()
```

```
Gini coefficients:
Year
2000    0.411
2001    0.412
2002    0.413
2003    0.414
2004    0.415
2005    0.416
2006    0.417
2007    0.418
2008    0.419
2009    0.420
2010    0.421
2011    0.422
2012    0.423
2013    0.424
2014    0.425
2015    0.426
2016    0.427
2017    0.428
2018    0.429
2019    0.430
```