An Exploration of The Relationship Between Maritime England Port Weather and Traffic Around England Port.

Oyedoyin Agbaje[1]

[1]University of Westminster, [2]HERE Technologies

Background and Motivation

This project is a Here Technologies project which aims to tell the data story of marine transportation considering the relationship between marine transport operations, such as shipping schedule and weather with traffic around selected England ports. In addition, the objective is to show the identifiable trends in the analysis of available open-source data.

Several researchers have studied the dependence between Marine transportation and economic growth. Marine transportation growth depends on population growth, increased standard of living, rapid industrialisation, exhaustion of location resources, elimination of trade barriers and road congestions (Christiansen et al., 2007). Marine transportation, though known as the backbone of international trade, also depends on economic growth, which can improve international trade.

The insight obtained from the research can give insights into effect of marine operations on economic growth and overall effect on neighbourhoods around the England Port.

Data and Methods

The open-source data used in this project was acquired from:
- Office For National Statistics (ONS) website
- Visual Crossing website

Each of the datasets have about sixteen thousand observations (16,000) and twenty (20) features.
The following are the data preparation steps used:
- Data Quality Check
- Null Management
- Duplicate Checks
- Categorical Analysis
- Dataset Exploration
- Statistics Summary
- Data Distribution Analysis

An exploration of the dataset was carried out. The following are the insights from the exploration of the vehicle flow around England port:
- The traffic flow tremendously declined from 2017 until 2022 in all the eight England ports.
- The vehicle sizes 5.2 metres in length are predominantly on roads around England ports.
- London port is the busiest port of the eight England ports studied in this project.

The results of these explorations are shown Figure 1.

A Correlation analysis carried out after data exploration shows no correlations between weather conditions and traffic flow around the England ports.

Key Findings

London port has the highest vehicle flow around its port compared to the other ports considered in this project. The autocorrelation analysis of the weather and traffic flow data across the five years shows that they are stationary.

An autocorrelation analysis was carried out on the London ports dataset graphically and by generating the autocorrelation values. Figure 2 shows the autocorrelation result of London port weather conditions like the wind direction, wind speed, wind gust, snow, sea level pressure and precipitation. The autocorrelation value of the total traffic sensor and vehicle flow for vehicles under 5.2 metres are equal.

The insights gotten from this project raised more questions that requires further investigation, which cannot be deduced based on the acquired data set for this project.
Further investigation is suggested to be able to answer the following questions:
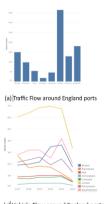- Could the decline in traffic around England ports between 2019 and 2022 be due to the post-Brexit effect and post-COVID-19 effect?
- What is the impact of the traffic flow reductions on the England economy?
- Does this imply a reduction in England's population?
- Can the reduction in vehicles around England ports have reduced Ultra-low emissions around England Ports?

Value of the research

This research can help plan for unforeseen circumstances that can affect marine operation, international trades and economic factors.

This project cannot give a conclusive result on the effect of the downward movement in vehicle flow on socioeconomic growth from 2019 until 2022. Further research into the actual state of economic growth between 2019 and 2022, with or without any external factor, will provide more insights.

Figure 1:

(a) Traffic Flow around England ports

(b) Vehicle Around England Ports by size in Metres

(c) Vehicle Flow around England ports

Figure 1: Data Exploration