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CARBON FOOTPRINT IMPACT OF HOLIDAY e-COMMERCE: A CASE STUDY OF SAO PAULO, BRAZIL

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Abstract

The current study investigates the environmental impacts of e-commerce during holiday season by calculating the carbon emissions of the package delivery trucks. Two years of e-commerce data for Sao Paulo city from 2016 to 2018 were statistically analyzed and carbon emissions were calculated using the US EPA CO_2 emissions standard for road trucks. After thorough data cleaning and data exploration, February and September months were considered for regular e-commerce while November, December were accounted for holiday e-commerce. One sided z-test at a significance level of 0.05 was performed to statistically compare the CO_2 emissions of regular and holiday e-commerce. Results show that holiday e-commerce contributed to around 32% of the total orders in 2017 and the CO_2 emissions were significantly higher at around 2 times more than those of regular e-commerce. The top 2 product categories that contributed to the CO_2 emissions (grams) for regular e-commerce were health and beauty (313.31g) and home (246.32g) respectively whereas for holiday e-commerce, furniture (746.73g) and home (349.45g) were top product categories. Learning from our study, we believe that this research contributes to and paves way for further research and future development in the understanding of environmental impacts of increased online shopping trends which leads to a rise in fuel consumption and emissions by the package delivery trucks.

Key words: carbon footprint, e-commerce, holiday shopping, python, statistical analysis

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