COMP3125 Individual Project

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# *Abstract: Over the past few years, e-commerce has expanded quickly, altering how consumers browse and engage with brick-and-mortar stores. This project analyzes how e-commerce is growing as a percentage of total retail, looks at the rise of worldwide e-commerce sales, and determines which regions are driving this increase. This research uses Statista data to highlight important trends and insights about the future direction of e-commerce and the elements that make it successful.*

# Introduction

# E-commerce has revolutionized the way people shop, driven by advancements in the internet, new technology, and shifts in consumer behavior. The COVID-19 pandemic further accelerated its global adoption, reshaping retail practices worldwide. This study examines the growth of e-commerce across the globe, identifying the nations and regions leading this expansion and exploring what the data reveals about its future trajectory. Key areas of focus include the growth of global e-commerce sales over the past five years, the evolution of e-commerce as a percentage of total retail sales, and the countries with the highest revenue growth in recent years. The findings provide valuable insights into the dynamics of the e-commerce market, highlighting opportunities for future development and offering guidance to stakeholders navigating this rapidly changing landscape.

## Source of dataset

The datasets analyzed in this project were sourced from Statista, ensuring credible and reliable data. They include metrics that provide a comprehensive understanding of e-commerce trends. One dataset, "Worldwide Retail E-Commerce Sales," tracks the growth of e-commerce revenues over time. Another dataset, "E-Commerce Share of Retail Sales Worldwide," examines the contribution of e-commerce to global retail sales. A third dataset, "Revenue Growth in E-Commerce for Selected Countries," explores region-specific and country-specific growth trends in the e-commerce sector.

# The datasets are formatted as tabular CSV files, containing information such as annual sales, percentage shares, and revenue growth rates. Key features of the datasets include time-series data on global sales in billions of dollars, e-commerce's percentage share of total retail sales, and revenue growth rates by country or region. Data preparation involved addressing missing values, standardizing units, and applying feature engineering techniques such as calculating yearly growth rates and aggregating regional data to enhance analytical clarity. These well-prepared datasets form the foundation for the study's data-driven insights.

# Methodology

# Data visualization served as the primary approach for analyzing trends and relationships within the datasets. Python libraries, such as **pandas**, **matplotlib**, and **seaborn**, were utilized to process and visualize the data effectively. Various visualization techniques were employed, including bar charts to illustrate e-commerce growth across regions and time, scatter plots to evaluate correlations between regional adoption rates and revenue growth, and line graphs for time-series trends.

Additionally, advanced analytical models were implemented to uncover deeper insights. Time-series forecasting with the **Prophet** library was used to predict future trends in e-commerce growth, while **K-Means clustering** grouped countries based on growth patterns and adoption rates. The methodology included systematically loading and cleaning datasets, ensuring data consistency, and constructing visualizations that provided clear and interpretable insights. This structured and reproducible workflow ensured robust and reliable

# results.

The analysis revealed significant insights into the dynamics of e-commerce growth. Between 2017 and 2027, global e-commerce revenues are projected to grow from $1.5 trillion to an estimated $8 trillion, representing a five-fold increase over 12 years. This trend highlights the explosive growth of the sector, further accelerated by the pandemic-driven digital adoption post-2020.

E-commerce's share of total retail sales also demonstrated steady growth, increasing from 18.8% in 2021 to a projected 22.6% by 2027. This rise underscores the expanding role of online channels in the global retail landscape. Additionally, specific countries showed remarkable growth rates in e-commerce. Mexico led with a growth rate of 25.1%, followed by the Philippines (24.1%) and Malaysia (18%). Emerging markets such as Argentina, Brazil, and India also displayed significant growth potential, while China’s growth stabilized at 11.4%, reflecting a maturing market. These results emphasize the diverse adoption rates and opportunities across regions.

A graph of sales

Description automatically generated

A graph with orange bars

Description automatically generated with medium confidence

A graph with a line going up

Description automatically generated

# Discussion

# The findings underscore the global impact of e-commerce, revealing both opportunities and challenges. Regions like Mexico, the Philippines, and Malaysia are leading in growth, reflecting untapped potential in emerging markets. At the same time, the steady increase in e-commerce's share of retail sales highlights its growing importance in consumer purchasing behavior worldwide.

# However, the results also point to regional disparities in growth patterns and market maturity. For instance, while emerging markets exhibit high growth rates, mature markets like China show slower growth, indicating saturation. These disparities suggest that targeted strategies are needed to address regional challenges and optimize growth. Furthermore, the study highlights the importance of understanding consumer behavior and technological infrastructure in shaping e-commerce success. Future research should explore the long-term sustainability of these growth patterns and the implications for global retail strategies.

# Conclusion

This study demonstrates the transformative role of e-commerce in the global retail landscape. The sector's rapid expansion, marked by significant revenue growth and an increasing share of retail sales, underscores its vital role in shaping consumer behavior and market dynamics. While emerging markets show immense potential for further adoption, mature markets face new challenges related to saturation and innovation. The insights from this analysis provide valuable guidance for businesses, policymakers, and stakeholders in navigating the evolving e-commerce market and harnessing its growth opportunities.

[1] Statista. *Worldwide Retail E-Commerce Sales*. Statista, 2024.

[2] Statista. *E-Commerce Share of Retail Sales Worldwide*. Statista, 2024.

[3] Statista. *Revenue Growth in E-Commerce for Selected Countries*. Statista, 2024.