

A low-angle, upward-looking shot of the Golden Gate Bridge, showing its iconic orange-red steel structure against a clear blue sky. The bridge's cables and towers are visible, creating a sense of height and scale. A large, semi-transparent red rectangle is overlaid on the upper left portion of the image, serving as a background for the title text.

# THE IMPACT OF ADVERTISEMENT ON AMAZON SALES

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# INTRODUCTION

In our study titled "The Impact of Advertisement on Amazon Sales," we utilize regression analysis to examine the relationship between annual advertising costs and net sales from 2014 to 2022. Our approach involves collecting data and computing descriptive statistics, as well as key regression metrics like multiple R, R Square, Adjusted R Square, and Standard Error. Additionally, we employ ANOVA to assess the significance of the linear relationship, examining F-Statistic, p-value, and Coefficients, including the intercept and advertising coefficient. This comprehensive analysis aims to quantify the influence of advertising expenditures on Amazon sales during the specified timeframe.



# THE IMPACT OF ADVERTISEMENT ON AMAZON SALES (DATA)

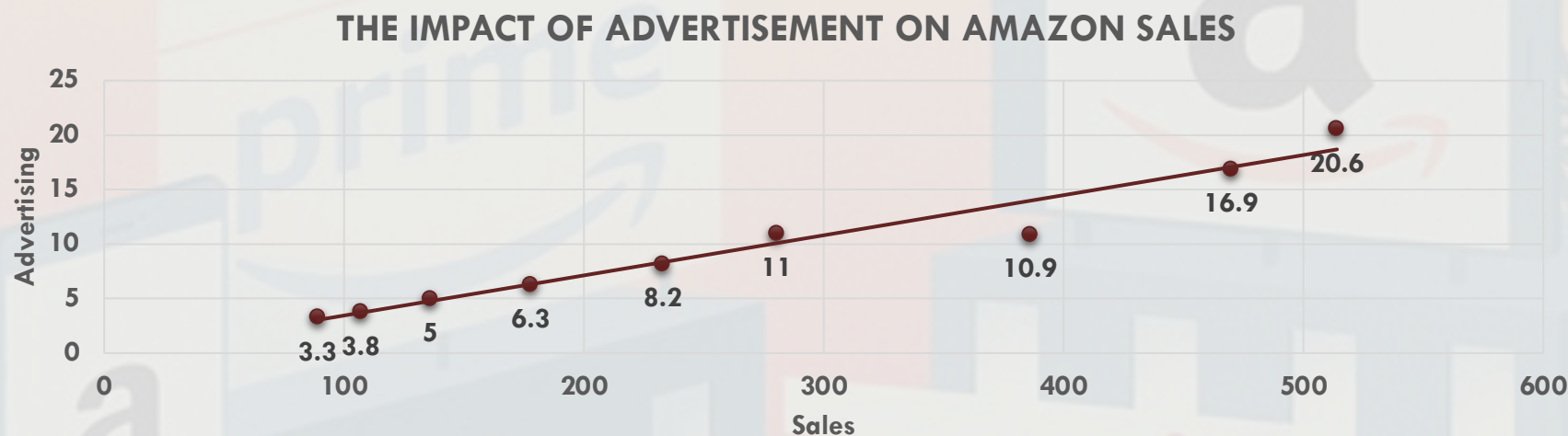
THE IMPACT OF ADVERTISEMENT ON AMAZON SALES

Year	Sales in Billions US. \$	Advertising in Billions US. \$
2014	88.99	3.3
2015	107.01	3.8
2016	135.99	5
2017	177.87	6.3
2018	232.89	8.2
2019	280.52	11
2020	386.06	10.9
2021	469.82	16.9
2022	513.98	20.6





# Correlation Coefficient



The correlation coefficient of 0.9674 between Amazon's annual advertising costs and net sales from 2014 to 2022 reveals a strong and positive relationship. This suggests that as advertising costs rise, there is a notable tendency for annual net sales to increase as well, emphasizing the considerable impact of advertising on Amazon's sales performance during this period.

## Correlation Coefficient Using Data Analysis

	88.99	4.01
88.99	1	
4.01	0.967406	1

# Descriptive Statistics

- **Minimum:**
  - Sales: \$88.99 billion
  - Advertising: \$3.3 billion
- **Maximum:**
  - Sales: \$513.98 billion
  - Advertising: \$20.6 billion
- **Mean:**
  - Sales: \$265.90 billion
  - Advertising: \$9.56 billion

	Amazon Sales	Amazon Advertising
Minimum	88.99	3.3
Maximum	513.98	20.6
Mean	265.9033333	9.555555556



# REGRESSION ANALYSIS

## Regression Analysis

Multiple R	0.974919836
R Square	0.950468687
Adjusted R Square	0.943392785
Standard Error	37.6224522

- **Multiple R (Correlation Coefficient): 0.9749**
  - Indicates a strong positive linear relationship between advertising expenditure and Amazon sales.
- **R Square (Coefficient of Determination): 0.9505**
  - Approximately 95% of the variation in Amazon sales can be explained by the linear regression model.
- **Adjusted R Square: 0.9434**
  - Adjusts R Square for the number of predictors in the model.
- **Standard Error: 37.62**
  - Represents the average distance between the actual sales values and the values predicted by the model.



# ANOVA (ANALYSIS OF VARIANCE)

## ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	190129.8096	190129.8096	134.324742	8.02705E-06
Residual	7	9908.142365	1415.448909		
Total	8	200037.952			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	19.20914527	24.70502914	0.777539875	0.46230459	-39.20896576	77.6272563	-39.20896576	77.6272563
Advertising in billions US. \$	25.81683363	2.227537215	11.58985514	8.027E-06	20.54954511	31.08412216	20.54954511	31.08412216





# Coefficients

- **Intercept (Y-Intercept): 19.21**
  - The estimated value of sales when advertising expenditure is zero.
- **Advertising Coefficient: 25.82**
  - For every additional billion dollars spent on advertising, Amazon sales are estimated to increase by \$25.82 billion.
  - This coefficient is statistically significant (p-value < 0.05).

	Coefficients
Intercept	19.20914527
Advertising	25.81683363



# ANALYSIS

## Correlation Analysis

- The relationship between the independent (Advertising) and dependent (Sales) variable is linear because it has a straight-line scatter plot pattern
- The Correlation Coefficient  $r$  (0.974919836) indicates that there is a positive relationship between Amazon's Advertising costs and its Sales from year 2014 to 2022

## Regression Analysis

- The estimated sample regression model is written as :  
$$\text{Sales}_{\text{hat}} = 19.21 + 25.82 * \text{Advertising}$$



# CONCLUSION

The analysis suggests that advertising investment has a substantial impact on Amazon sales. An increase of \$1 billion in advertising spending is associated with an increase of approximately \$25.82 billion in sales. The regression model is statistically significant, with a strong positive correlation and a high coefficient of determination. However, correlation does not imply causation, and other factors not included in the model could also influence Amazon sales. Overall, the analysis provides valuable insights for decision-makers.







# REFERENCES

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# THANK YOU

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