Tools and Models of Different Types of Analytics- Descriptive, Predictive, and Prescriptive Analytics &

Business Intelligence Tools

Figure 1.1: Tools of Descriptive Analytics

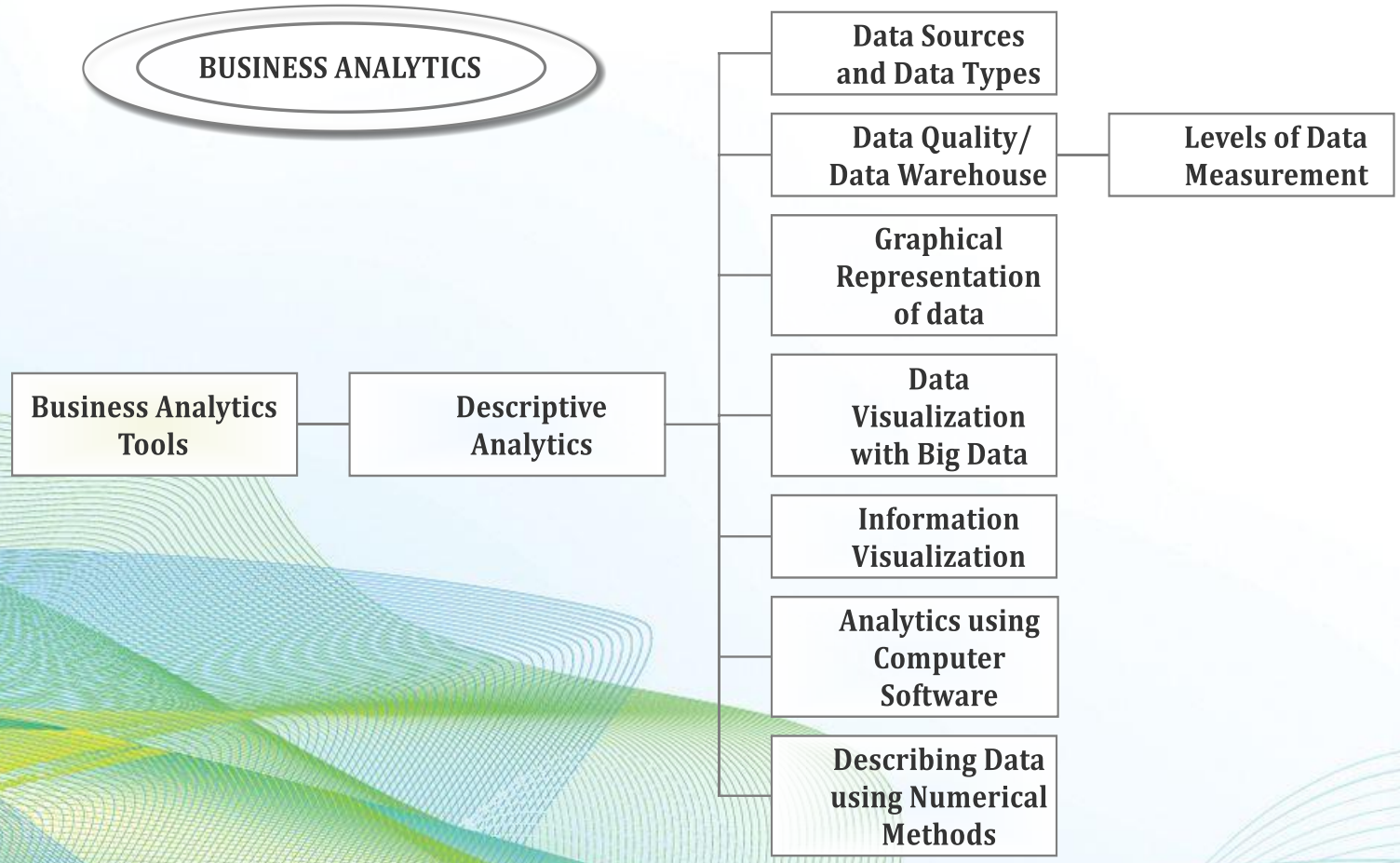


Figure 1.2: Tools of Predictive Analytics

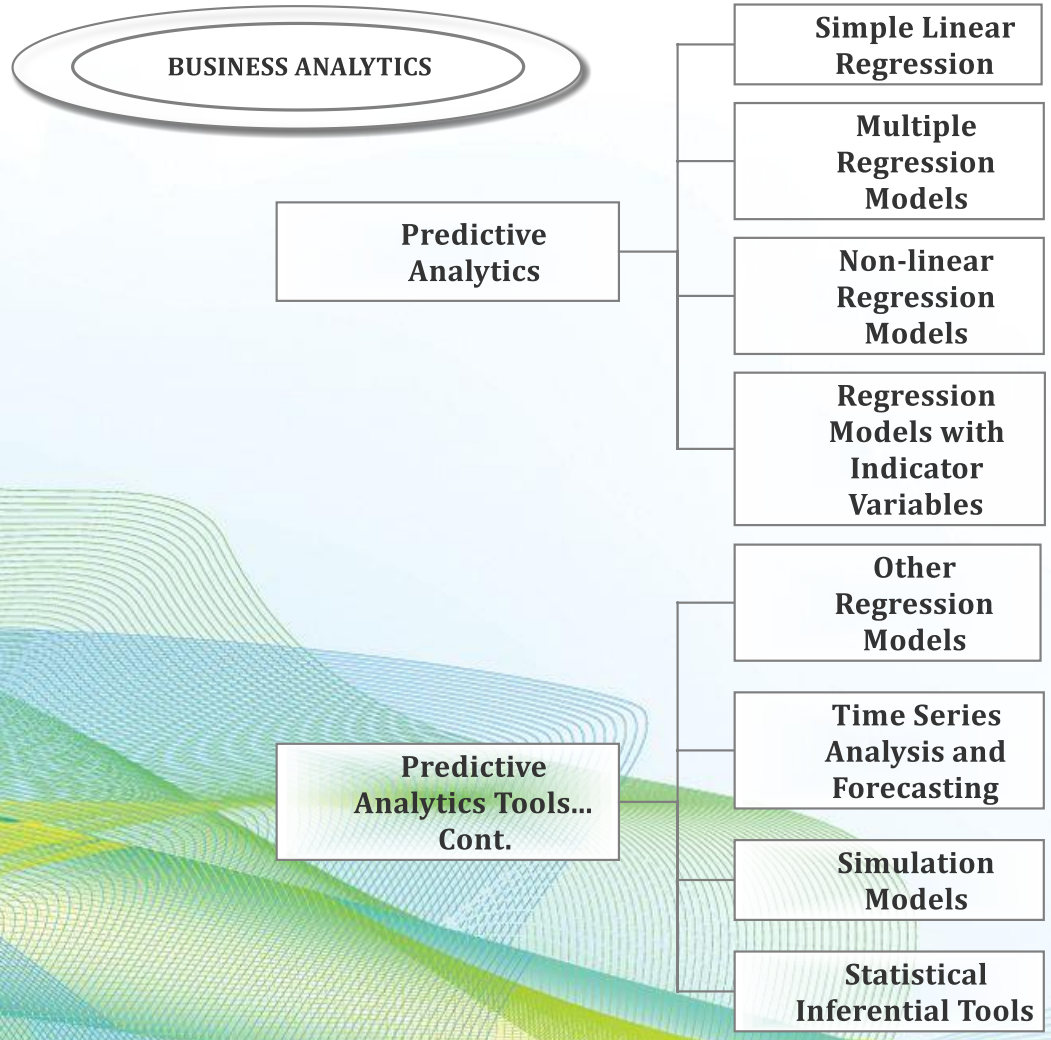


Figure 1.3: Prerequisite to Predictive Analytics

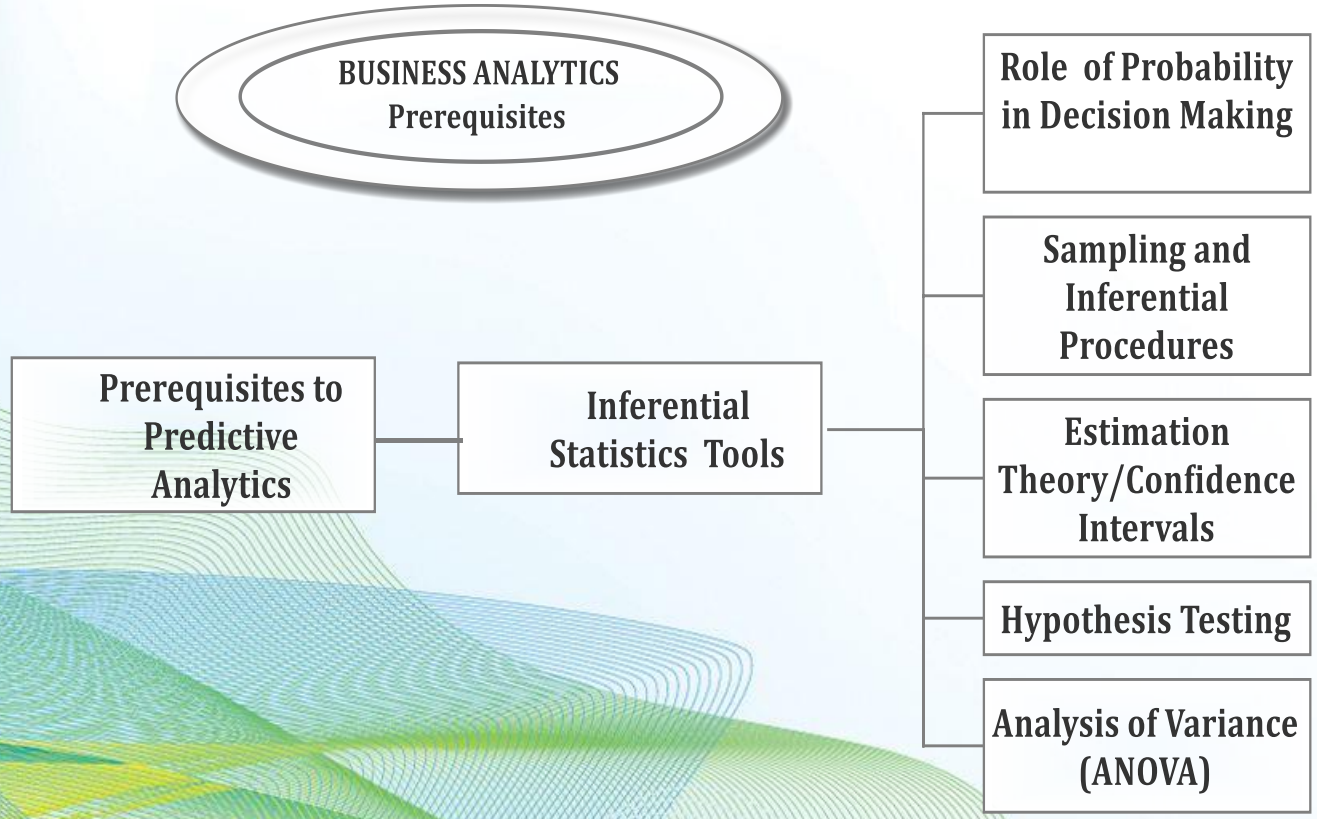


Figure 1.4: Recent Applications and Tools of Predictive modeling

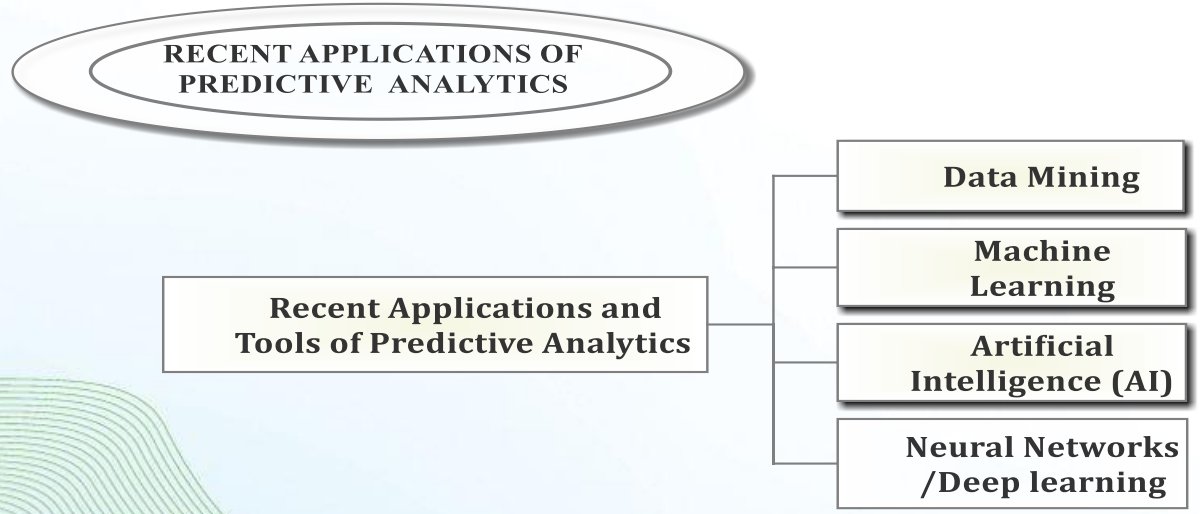
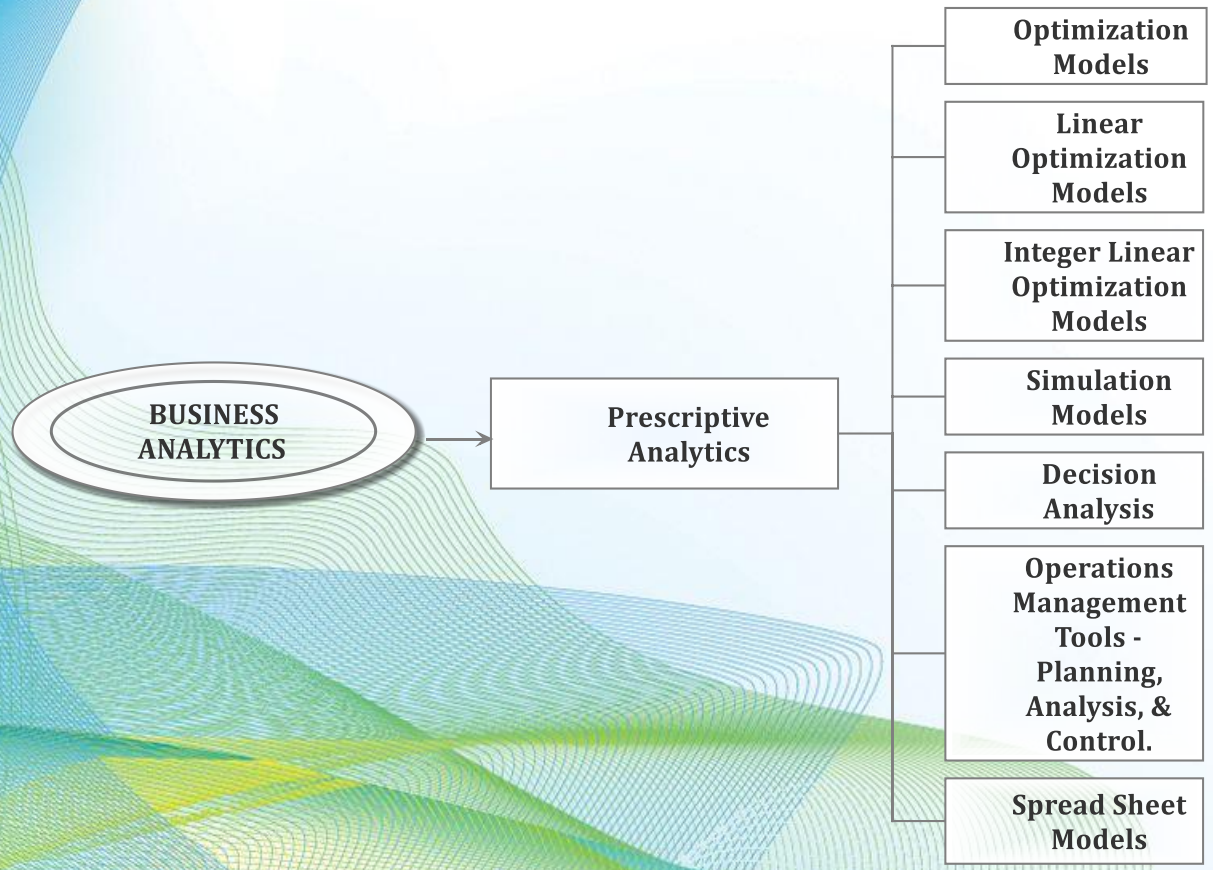


Figure 1.5: Prescriptive Analytics Tools



. ***Figure 1.6: Descriptive, Predictive, and Prescriptive Analytics Tools***

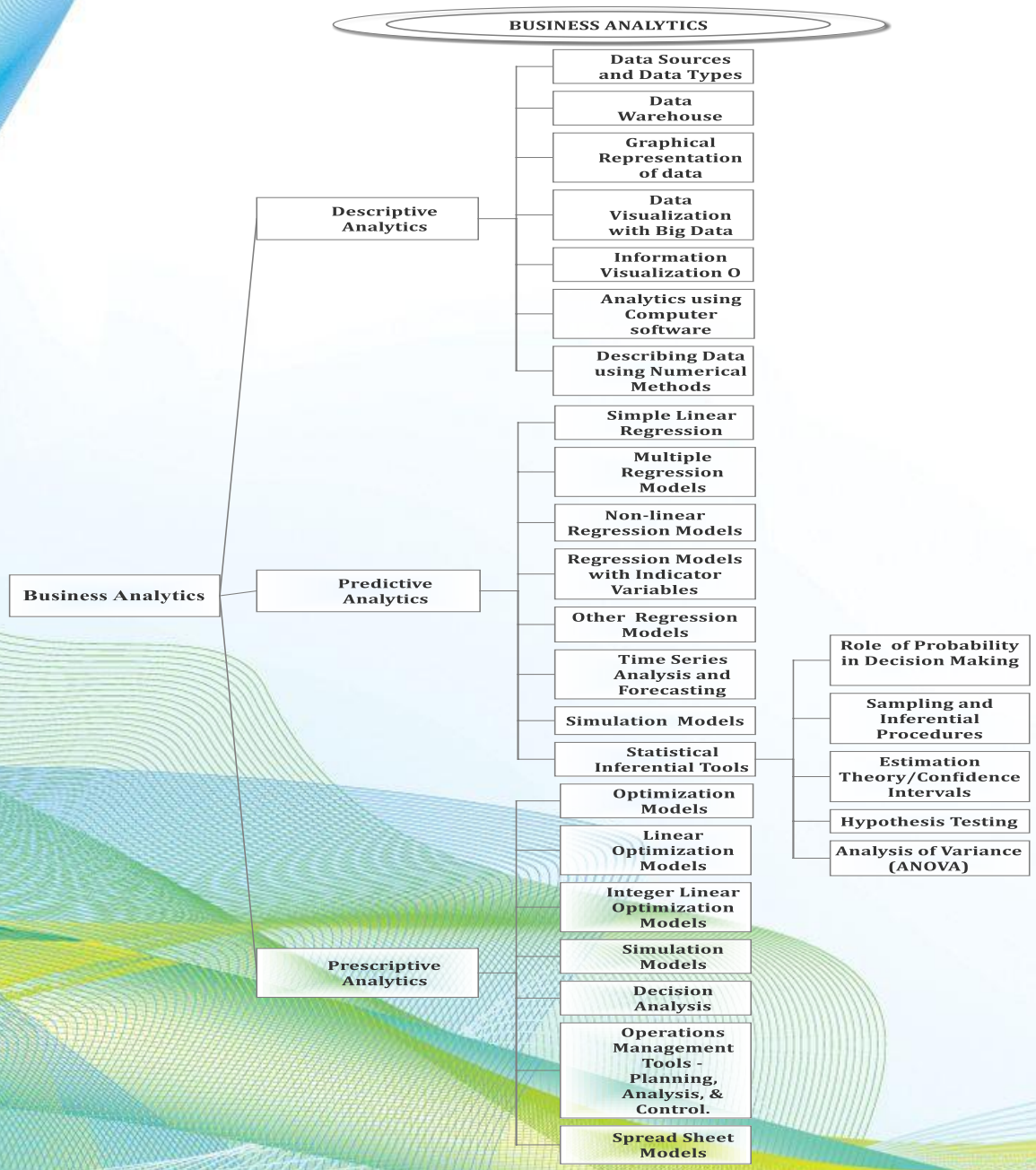


Figure 2.1: Input to the Business Analytics process, types of analytics, and description of tools in each type of analytics

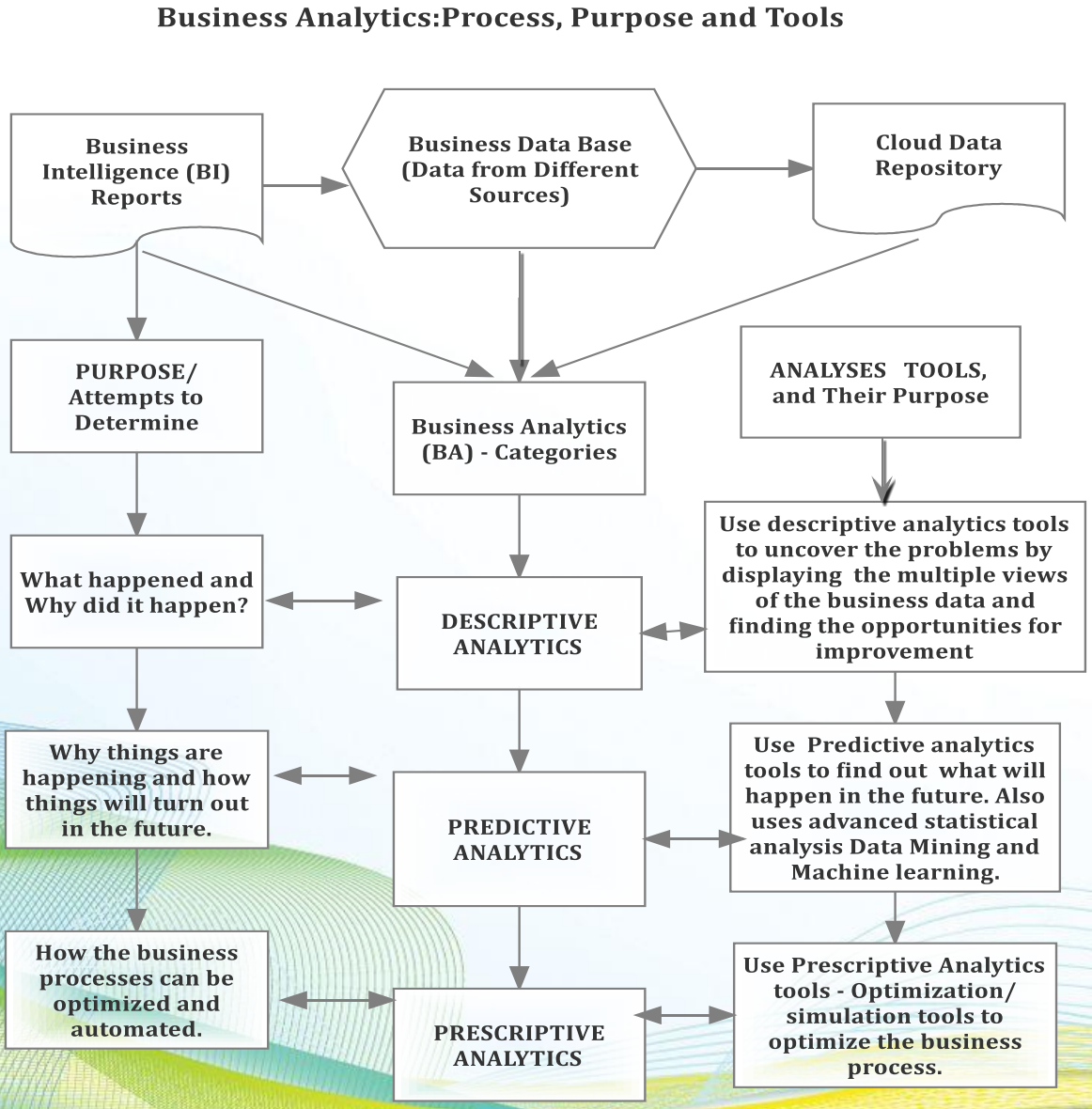


Figure 2.2: Interconnection between the tools of different types of analytics

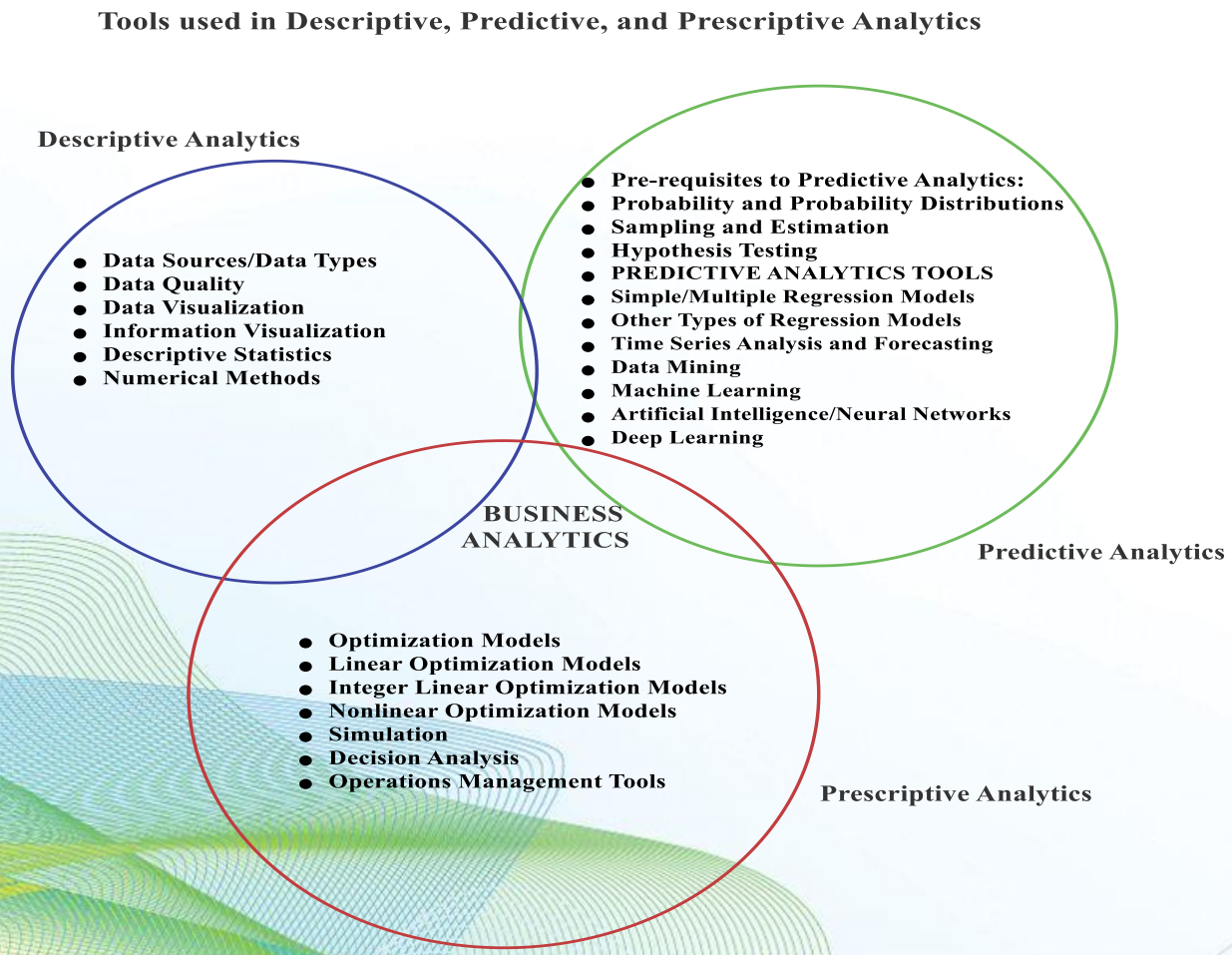


Figure 2.3: The Broad Area of Business Intelligence (BI)

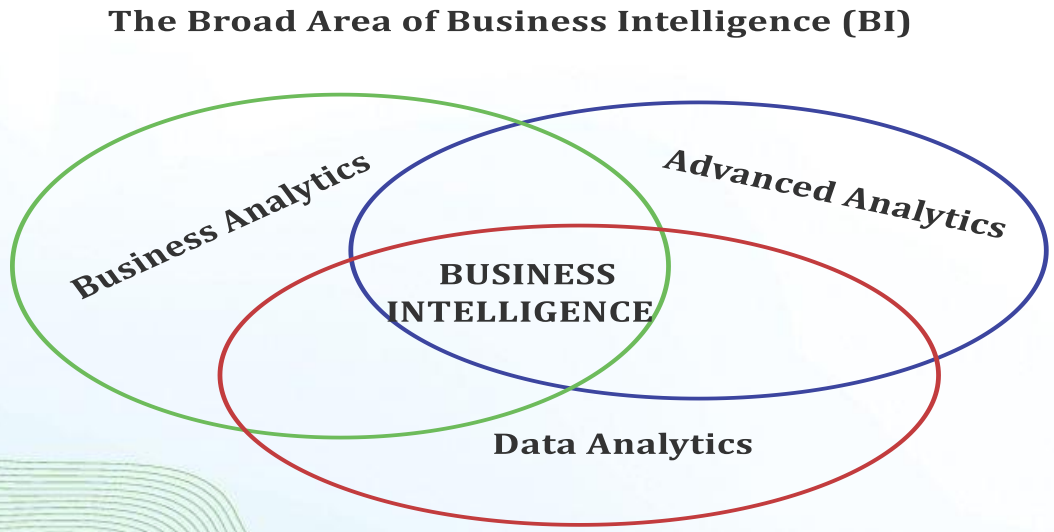


Figure 2.4: Comparing Business Intelligence (BI) and Business Analytics

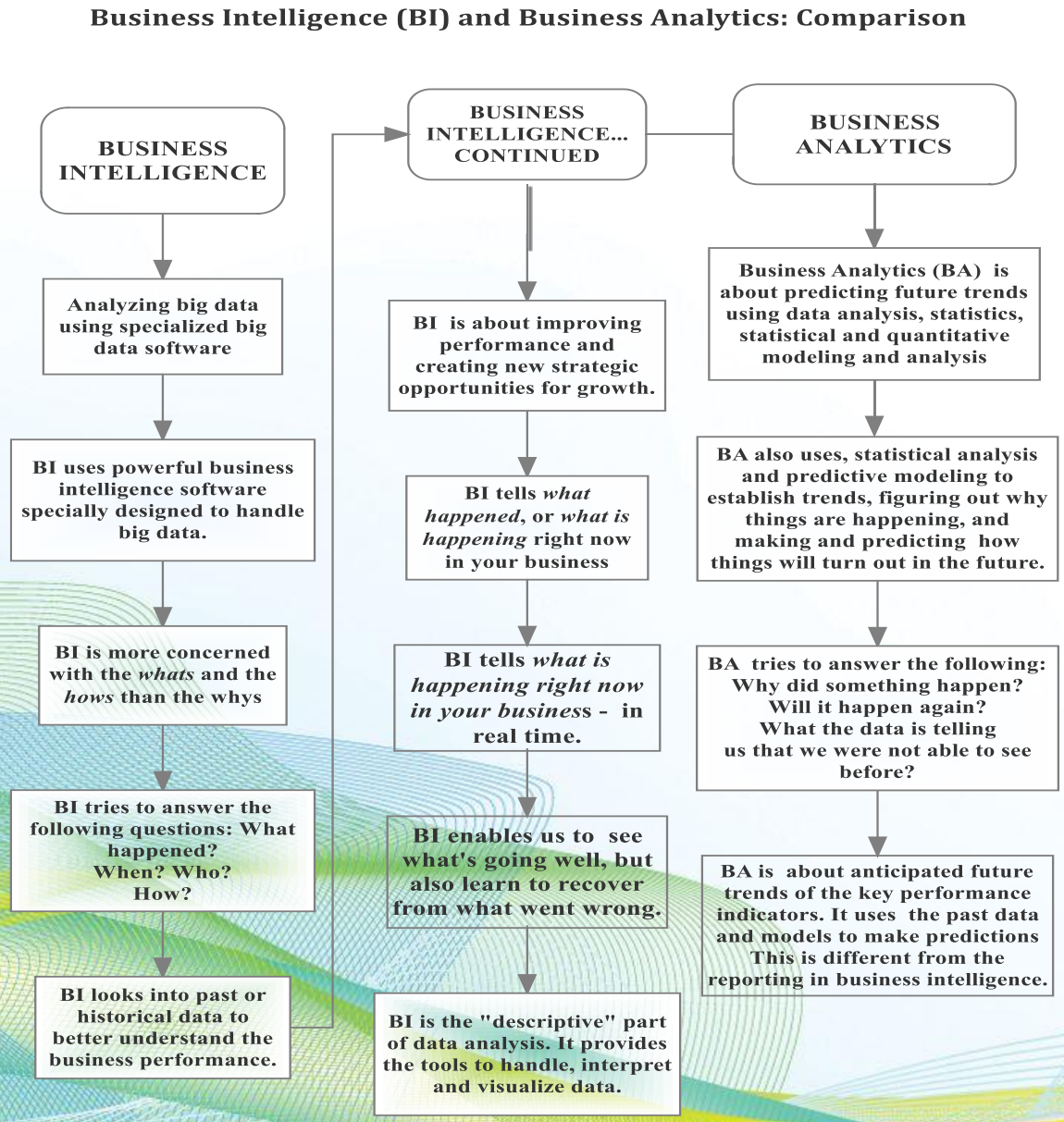


Figure 2.5: Business Intelligence (BI) and Business Analytics (BA) Tools

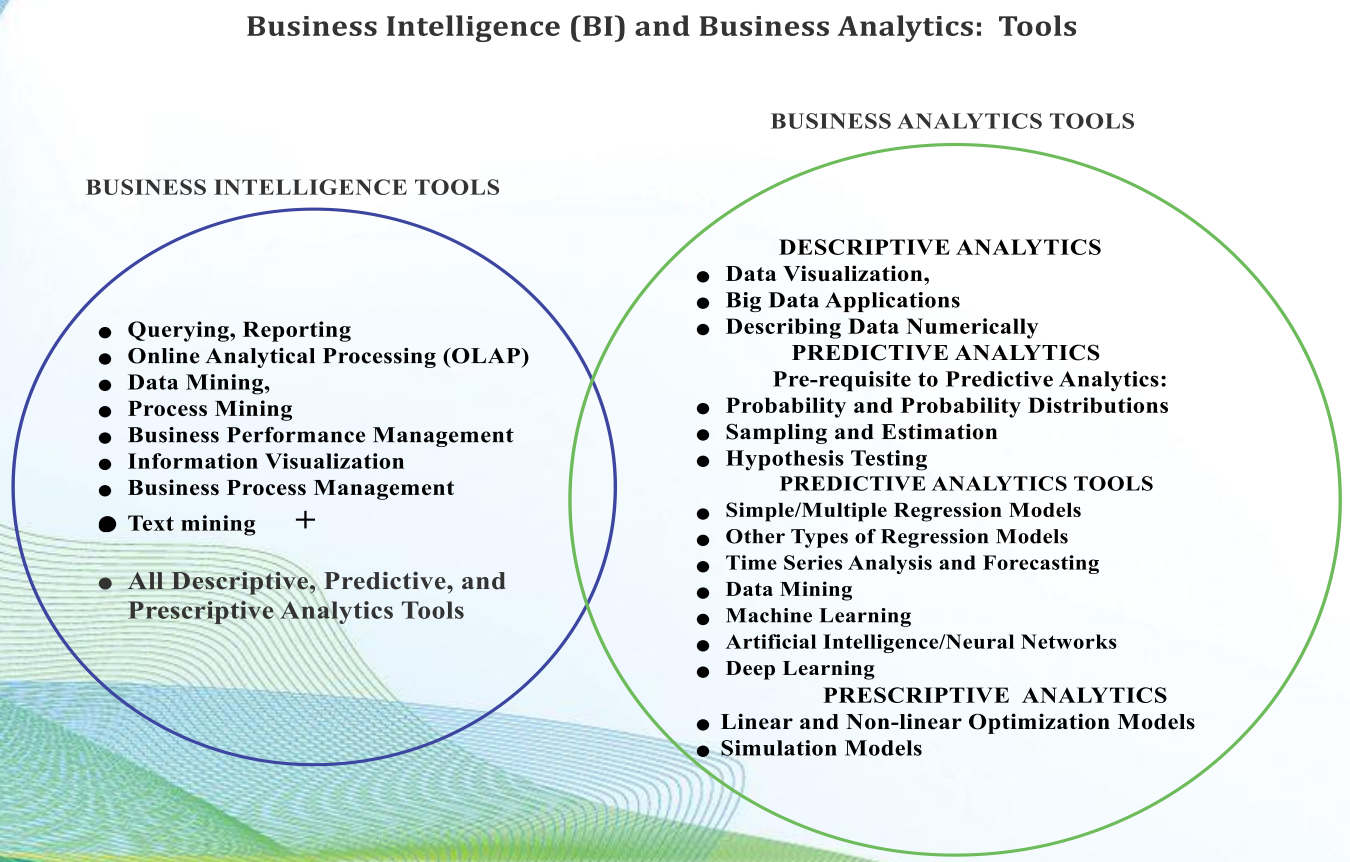


Figure 3.1 Business Intelligence and Support Systems

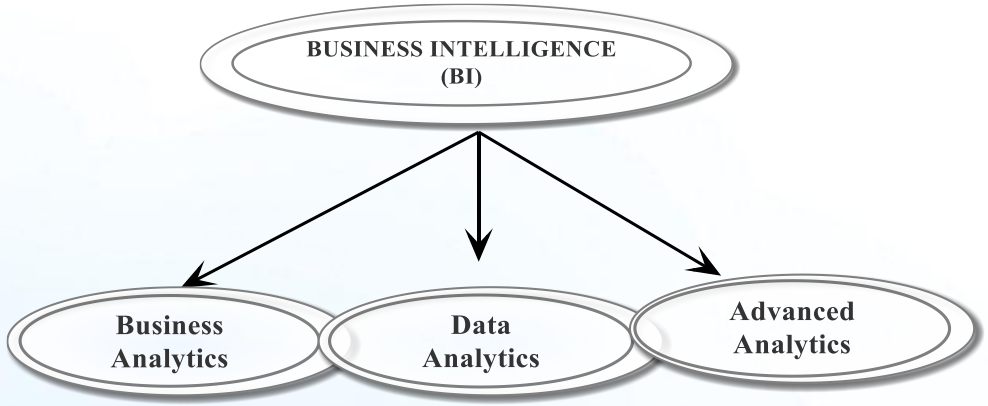


Figure 3.2: Functions and Application Areas of Business Intelligence (BI)

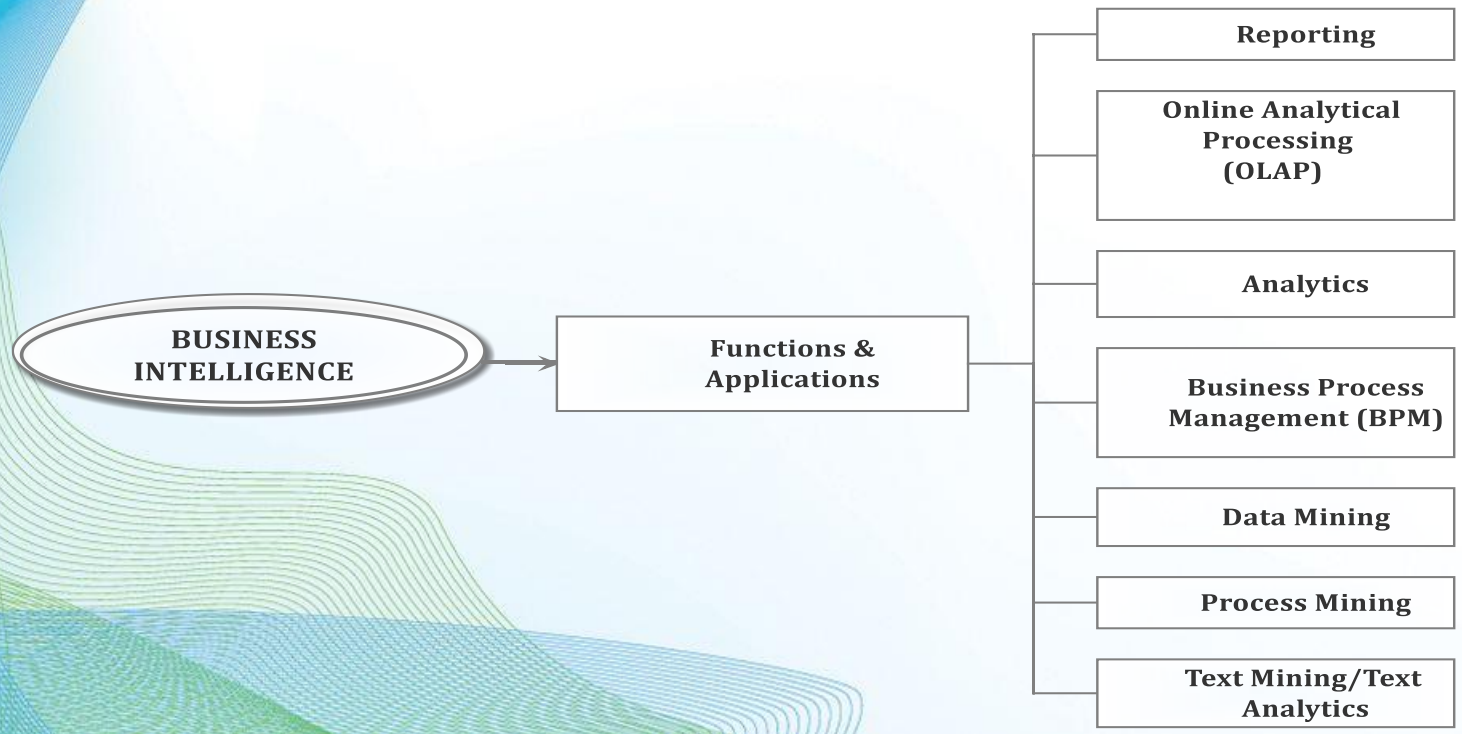


Figure 3.3: Types of Analytics

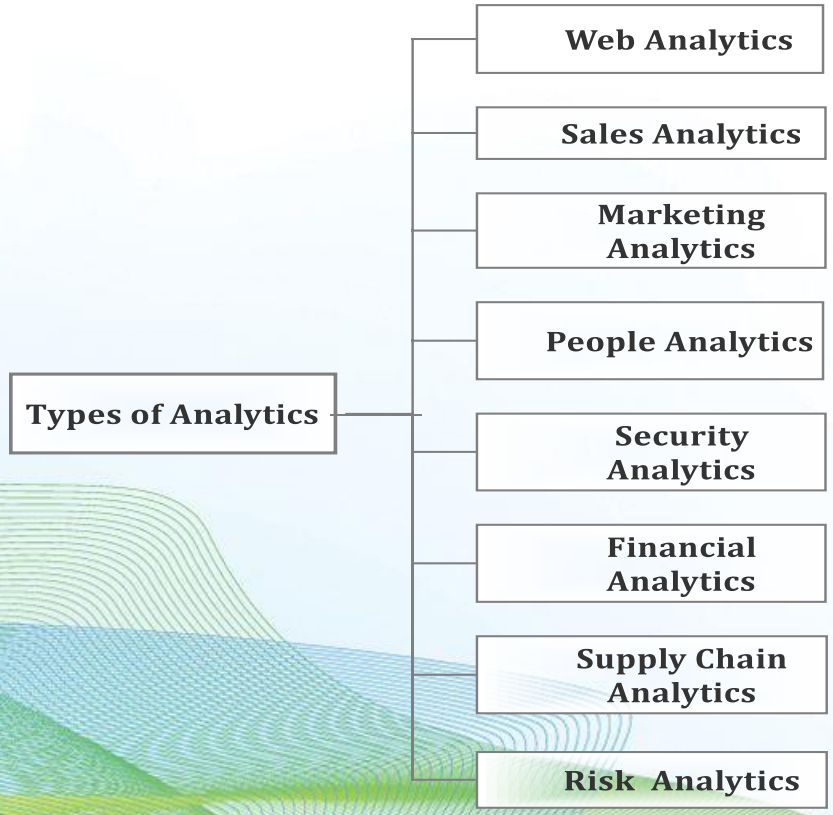


Figure 4.1: Tools and Methods of Descriptive Analytics

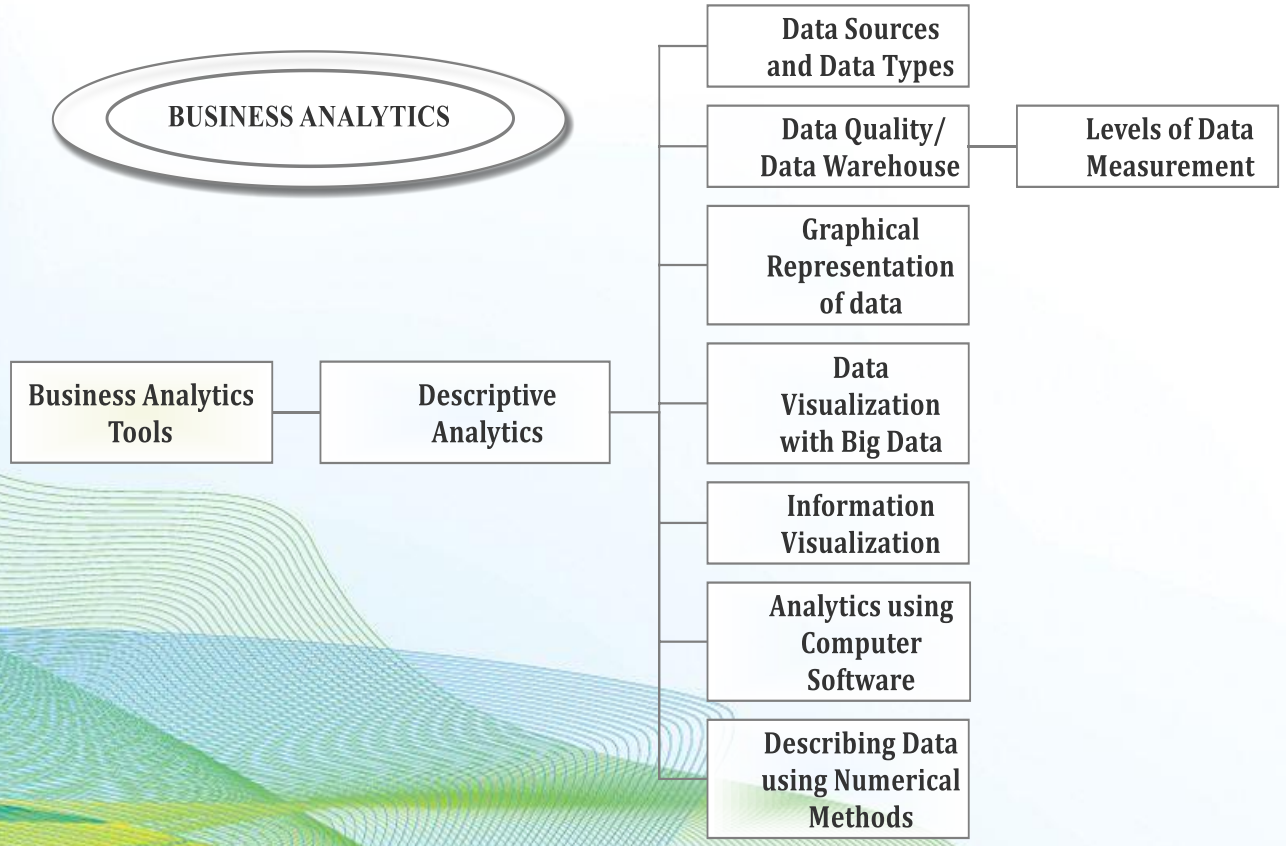


Figure 4.2: Number of Orders by Day

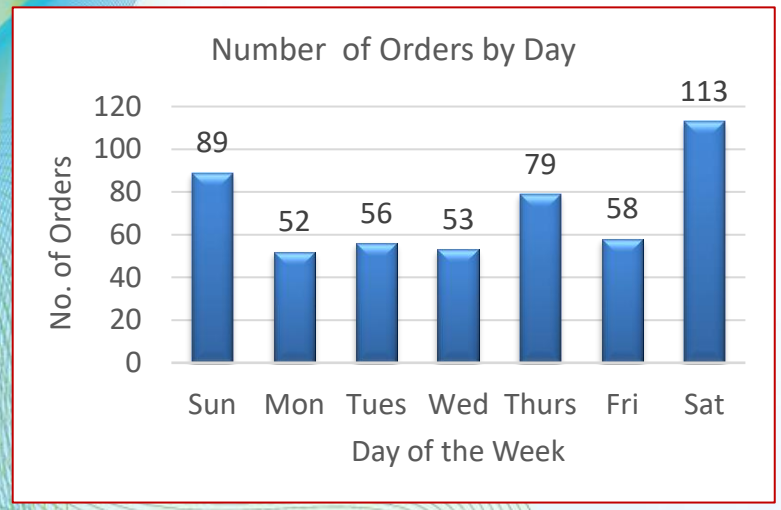


Figure 4.3: Number and Percent of Orders

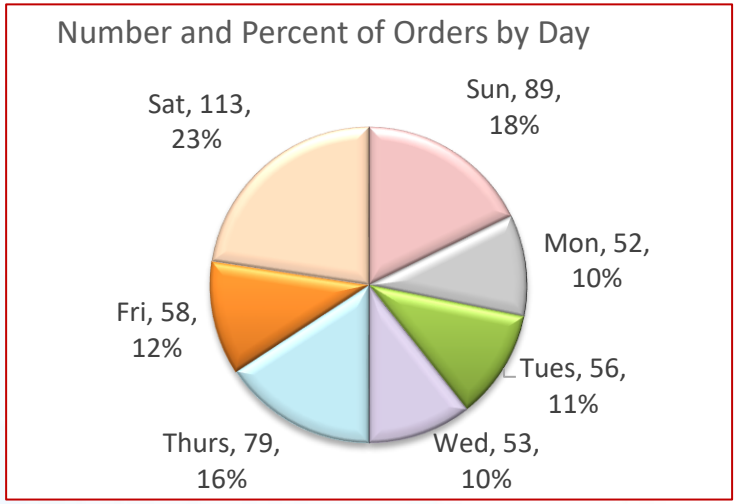


Figure 4.4: Plot of Number of Orders by Time

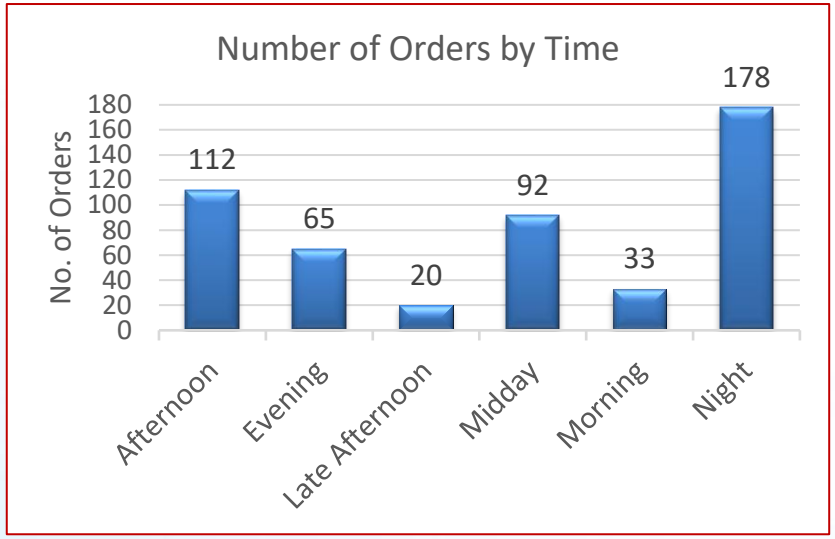


Figure 4.5: Number of Orders by Region

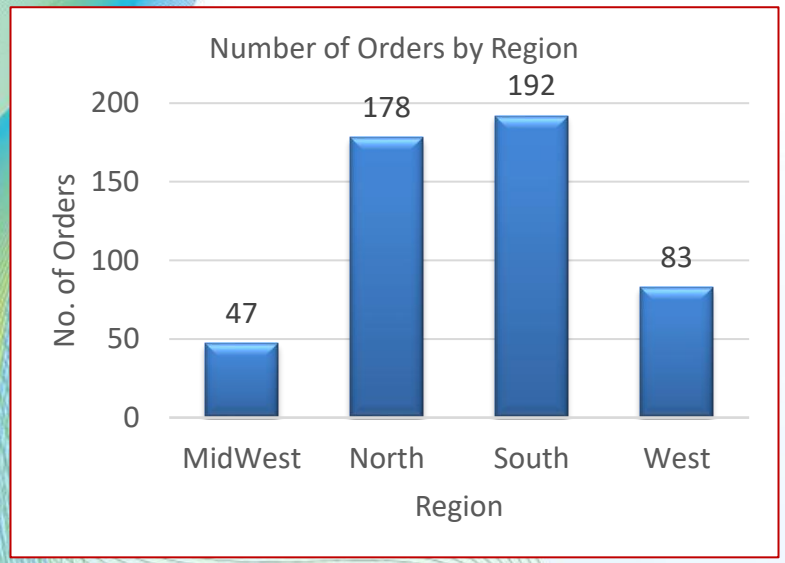


Figure 4.6: Percent of Orders by Region

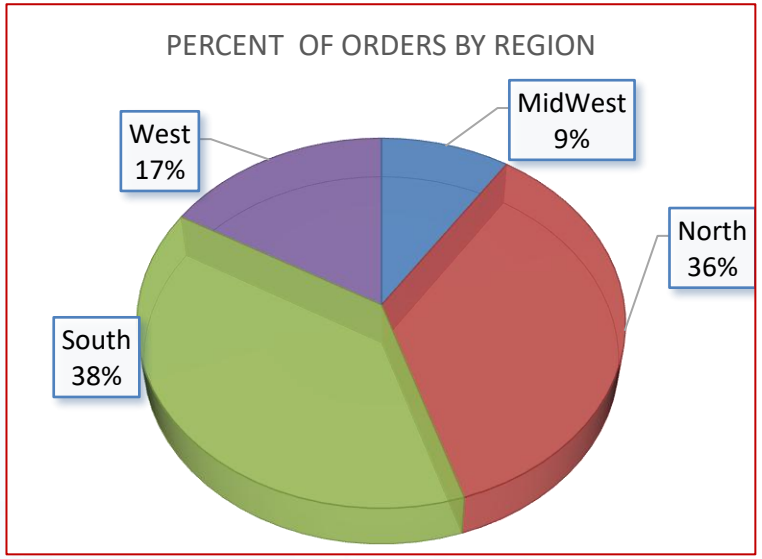
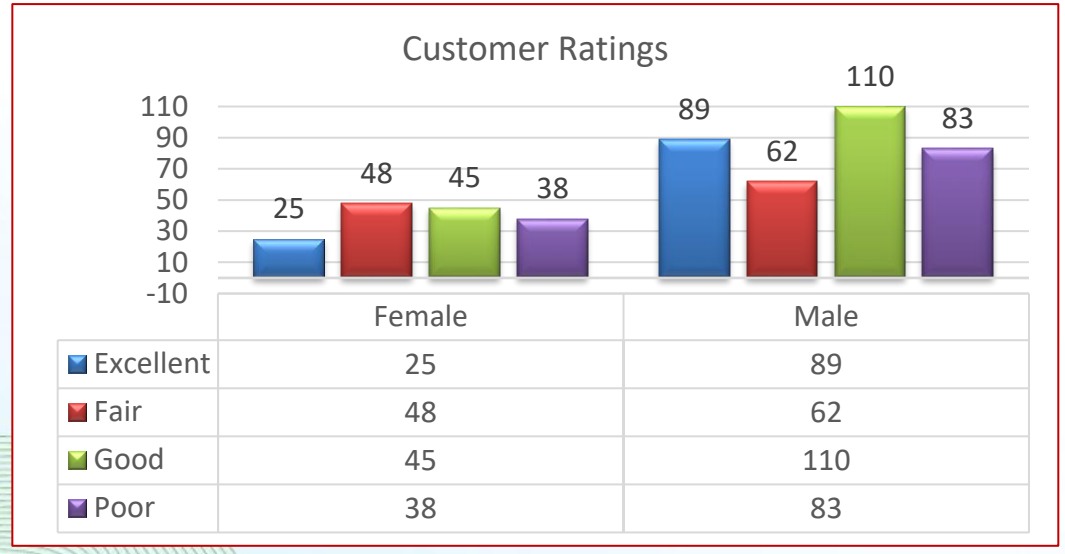


Figure 4.7: Customer Ratings by Gender



	Female	Male
Excellent	25	89
Fair	48	62
Good	45	110
Poor	38	83

Figure 4.8: Graphical Summary of the Total Orders Data

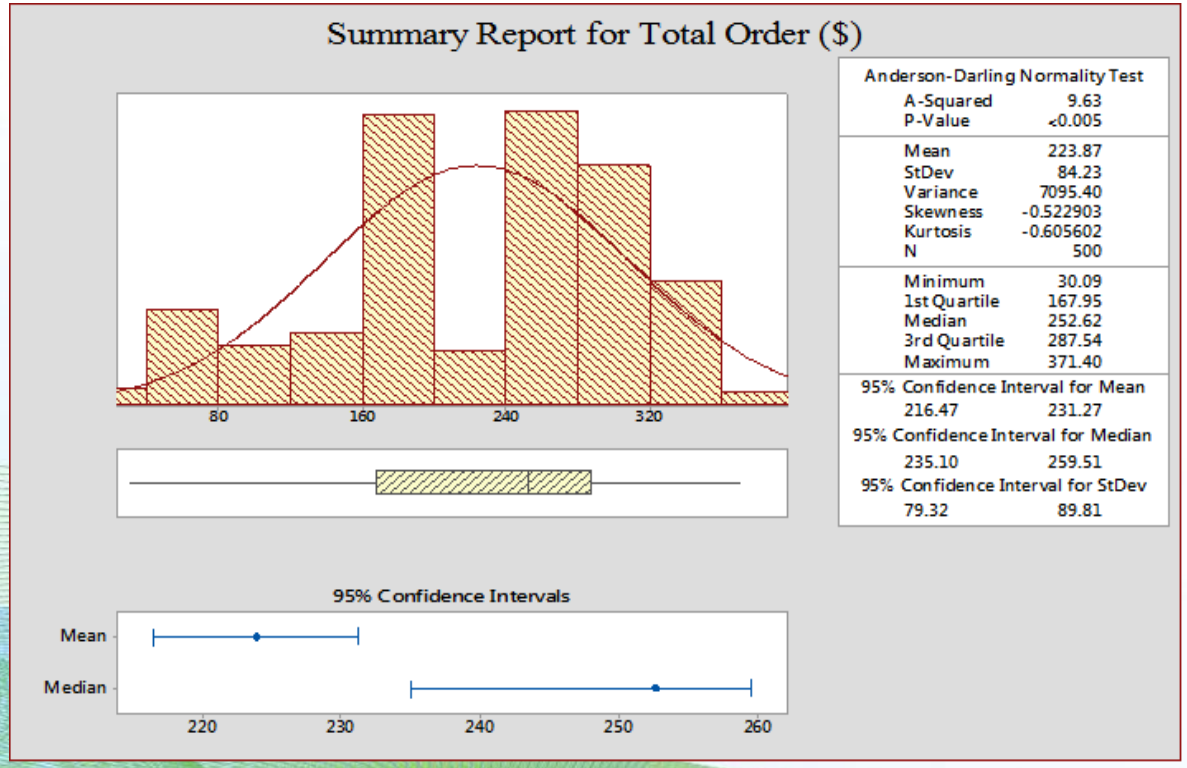


Figure 4.9: A dashboard of Online Orders Data

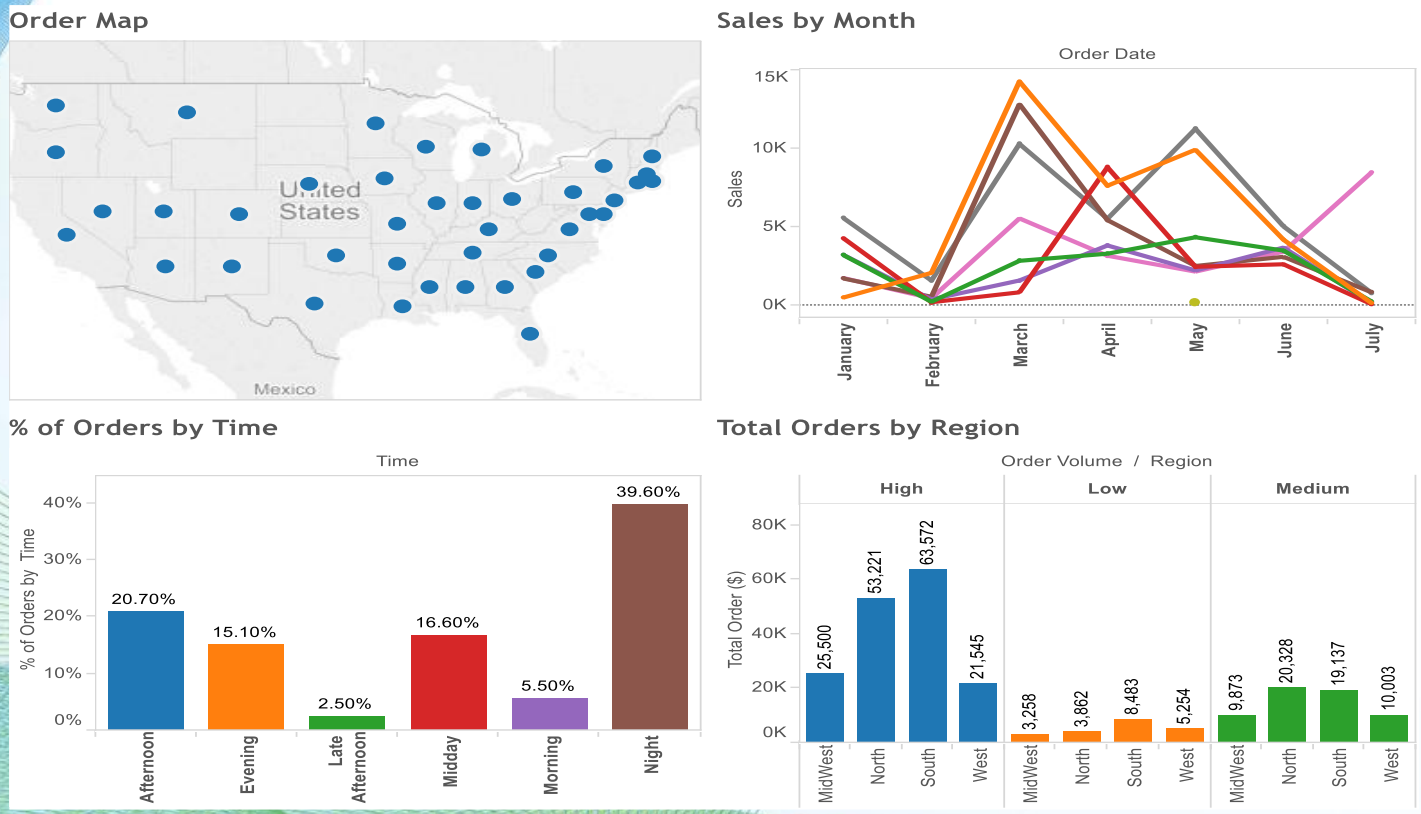


Figure5.1: Logic Driven Model of Predictive Analytics

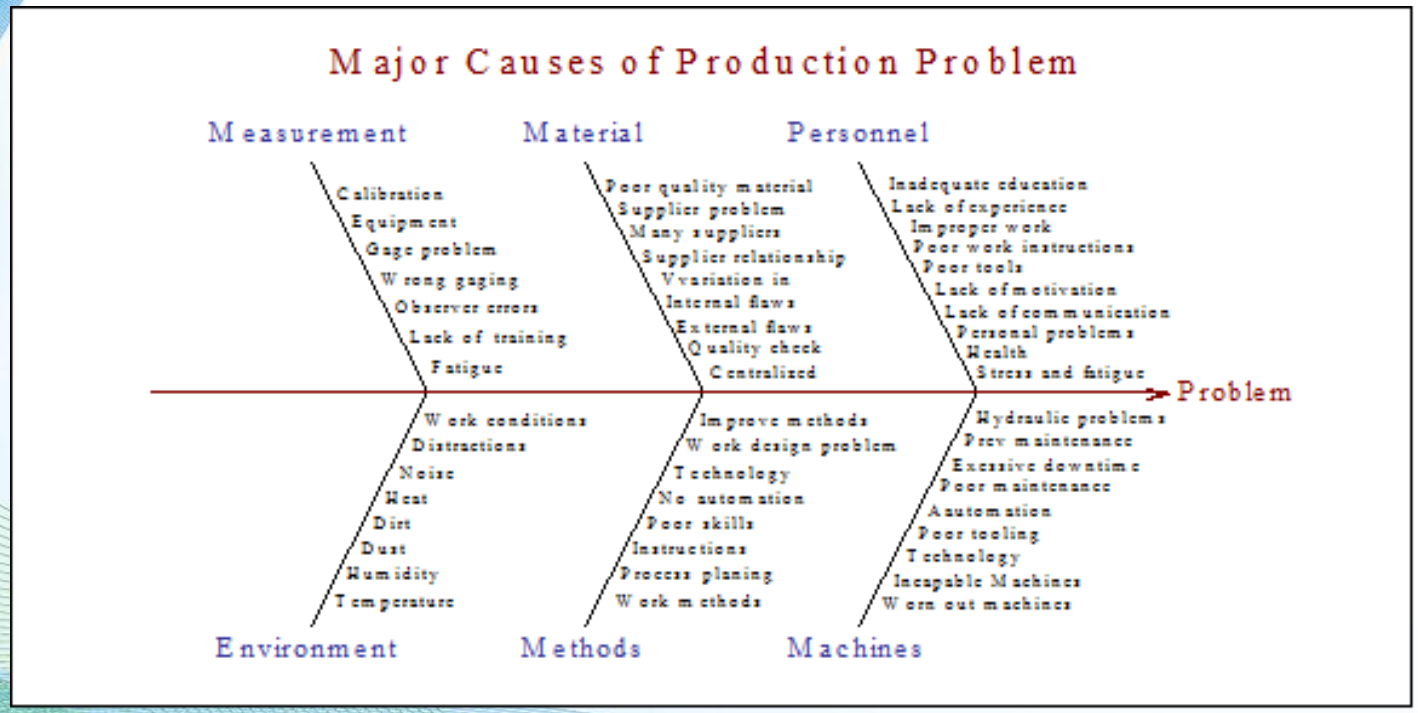


Figure 5.2:Pre-requisite and Models for Predictive Analytics

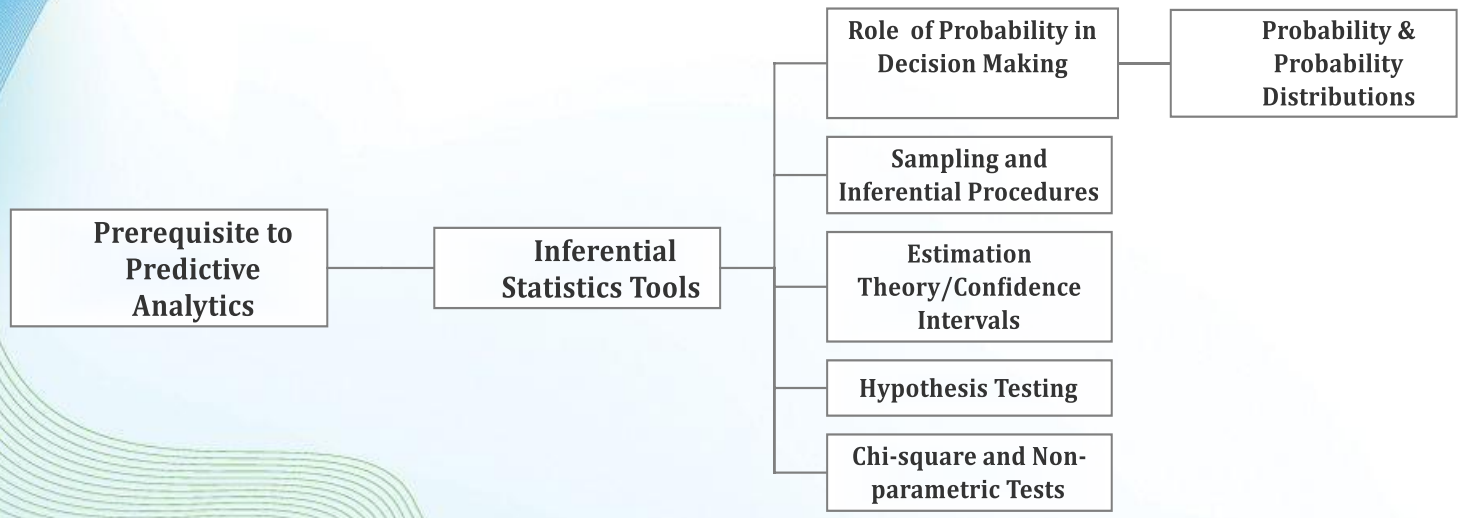


Figure 6.1: Predictive Modeling Tools

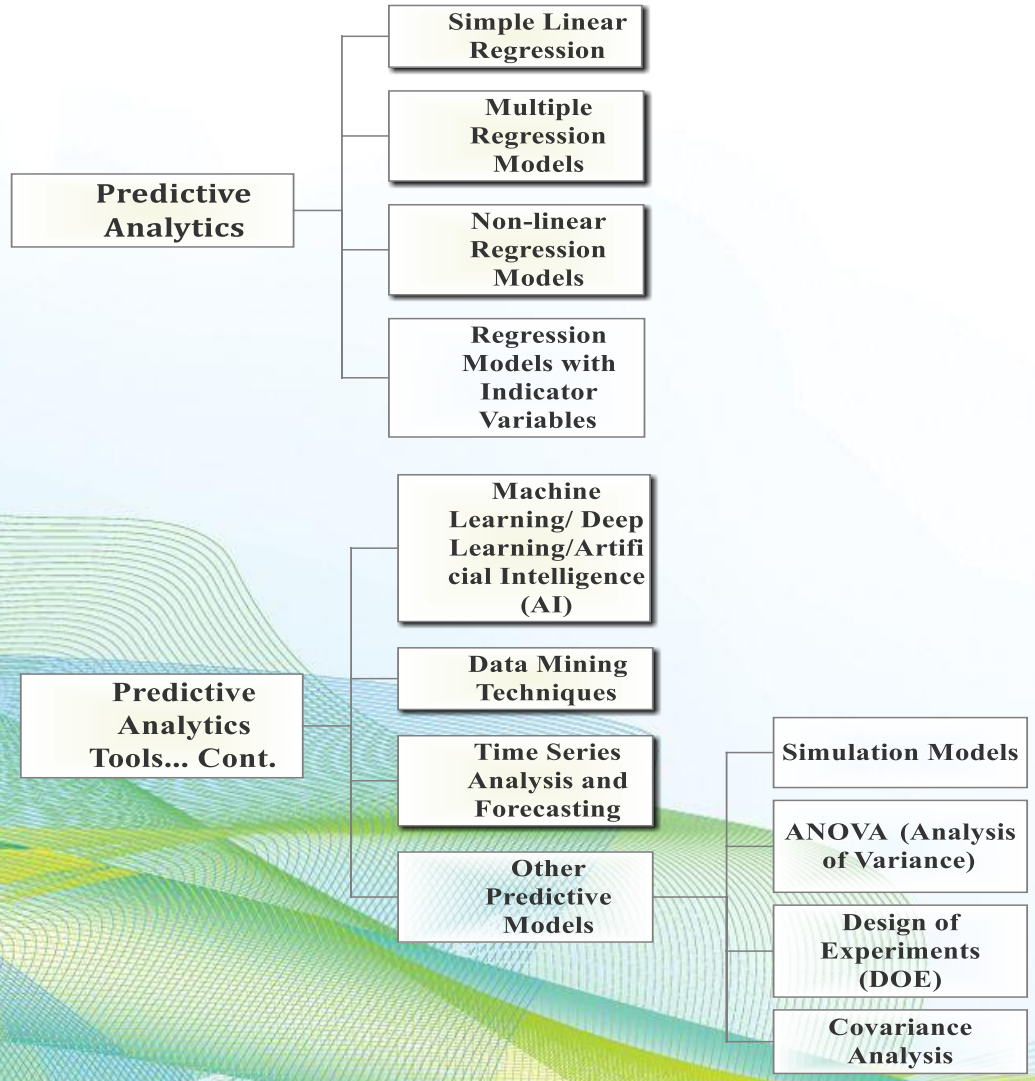


Figure 6.2: Scatter Plot of Sales vs. Advertising

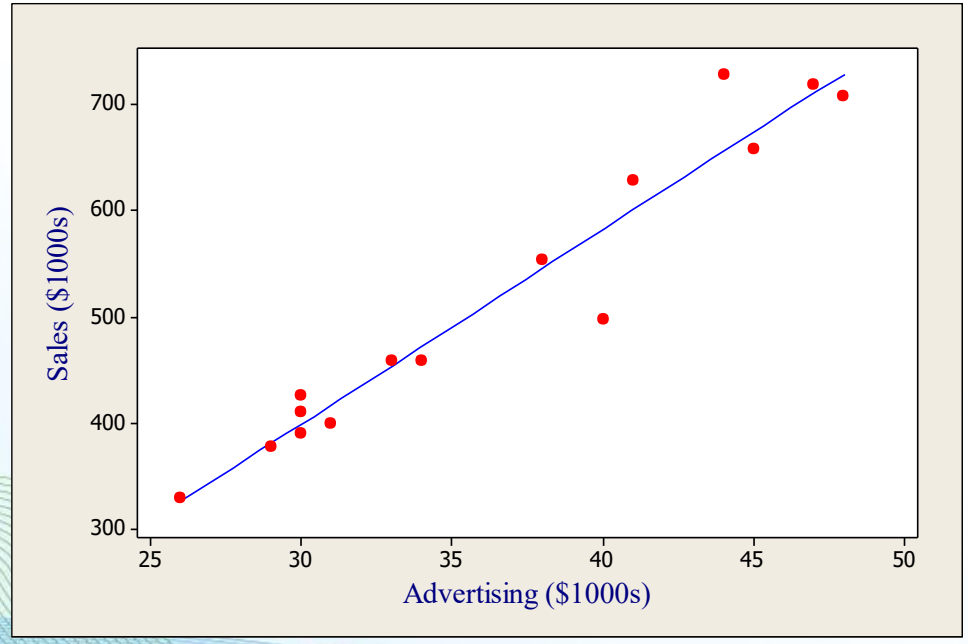


Figure 6.3: A Multiple Regression Model

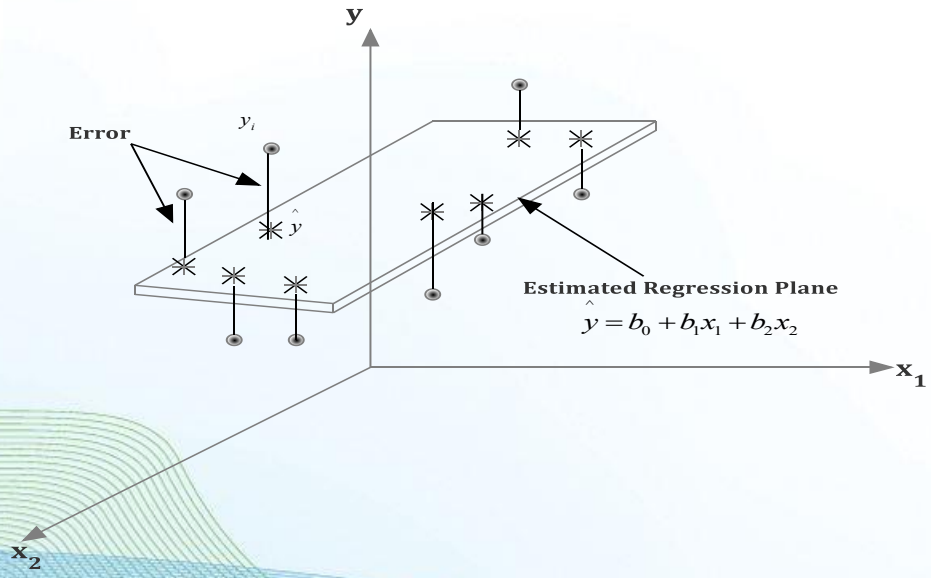


Figure 6.4: Scatter Plot of Life (y) vs. Operating Temp. (x)

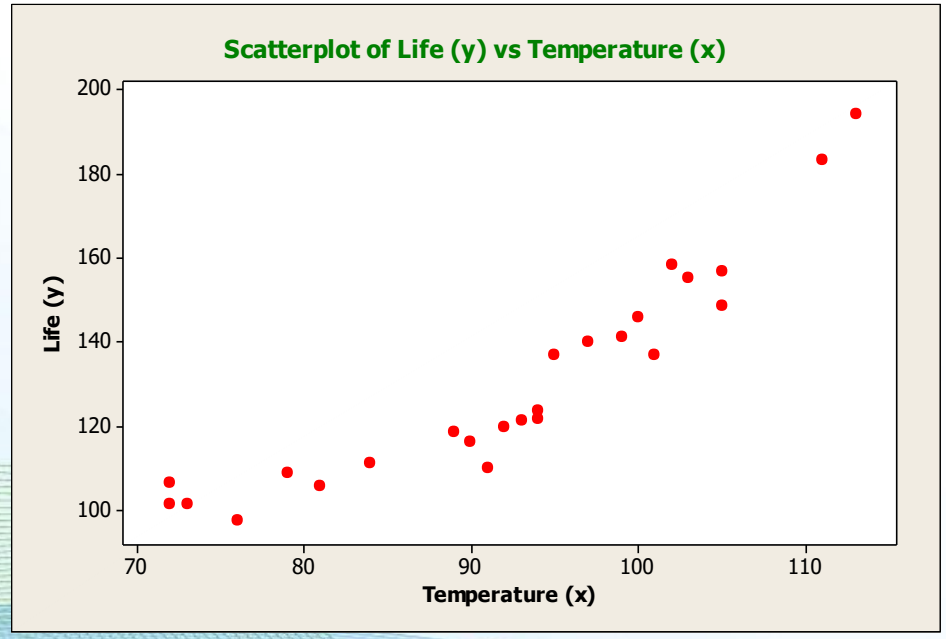


Figure 6.5: A Second-order Regression Model

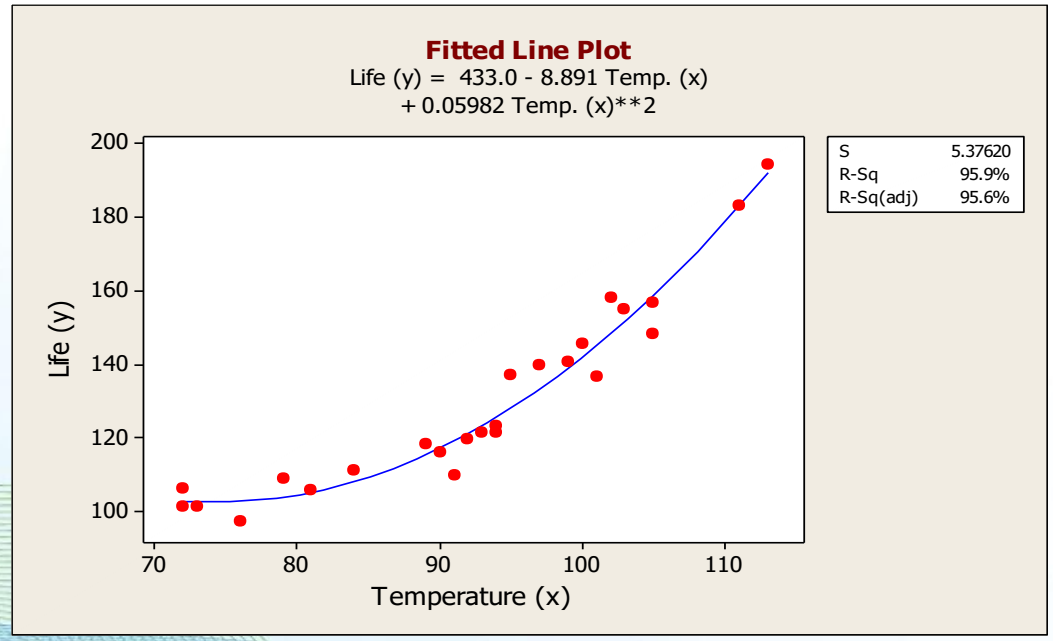


Figure 6.6: Plot of Demand over Time

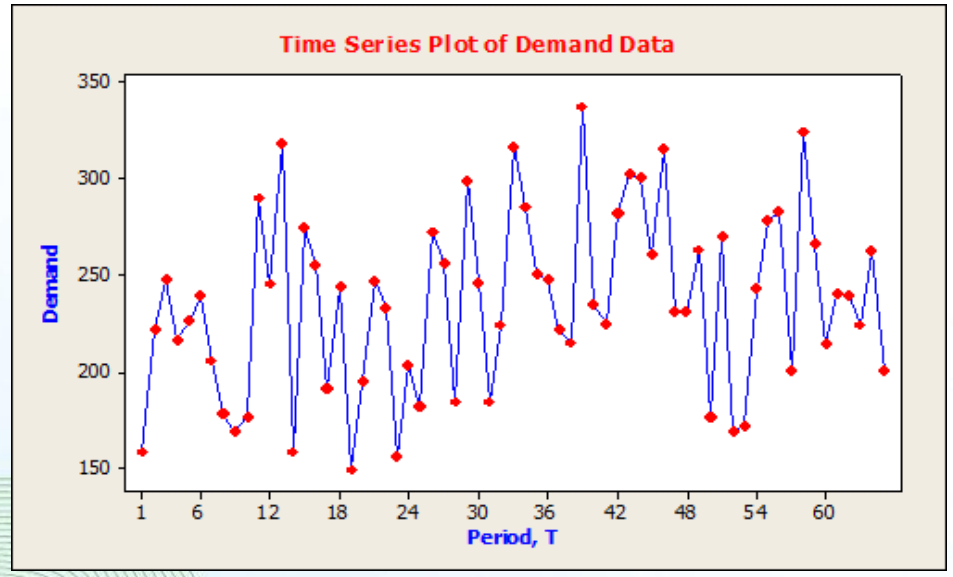


Figure 6.7: Demand and Forecast

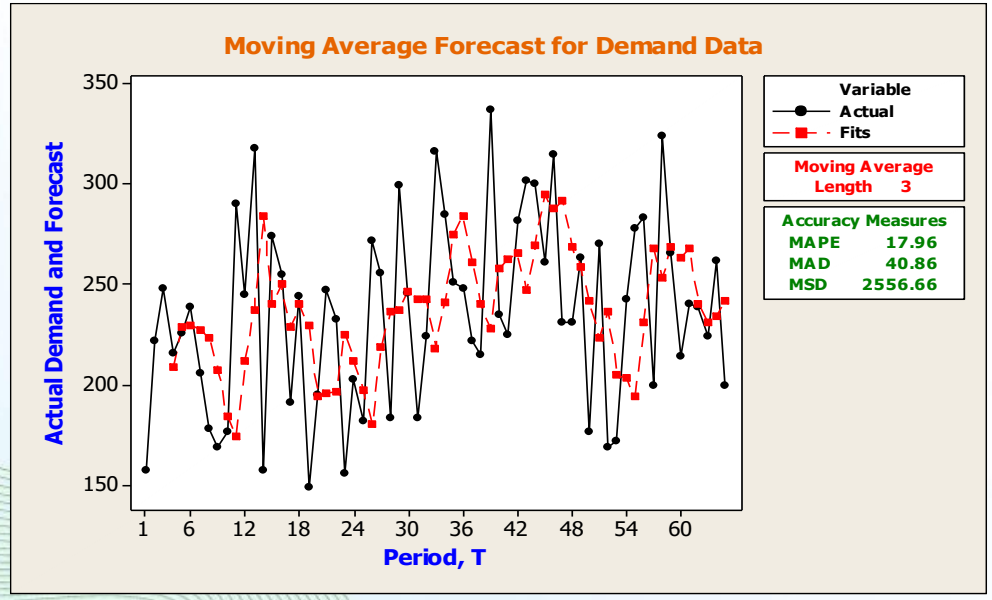


Figure 6.8 (a) Sales over Time

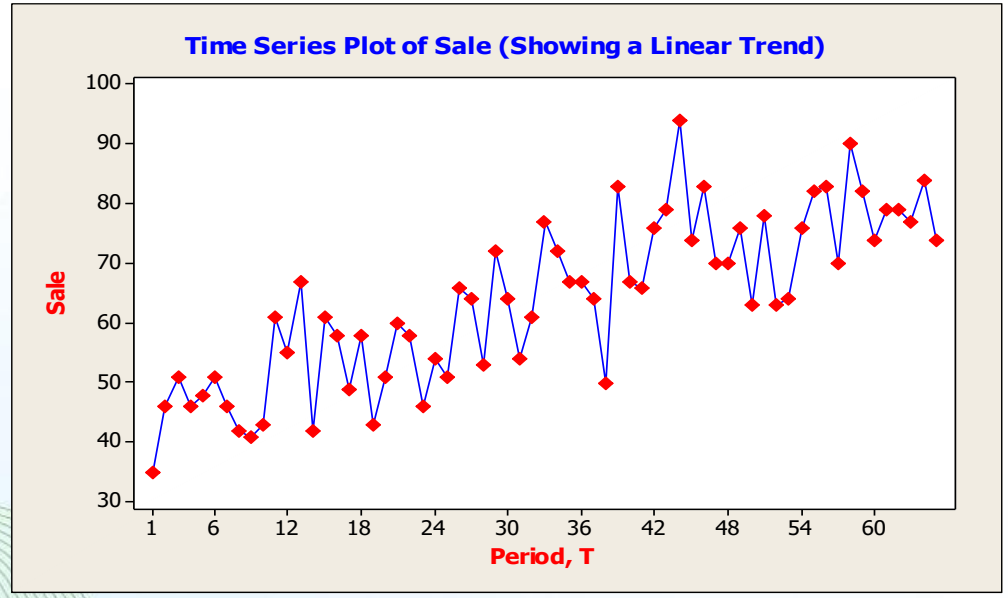


Figure 6.8 (b): Sales and Forecast for the Data in Figure 6.8(a)

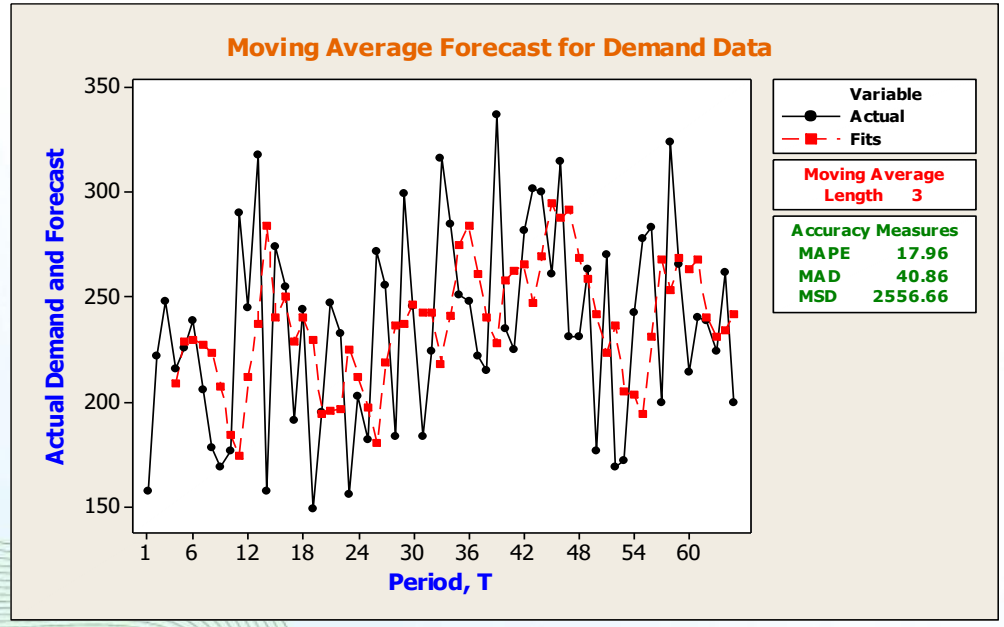


Figure 6.9: A Seasonal Pattern

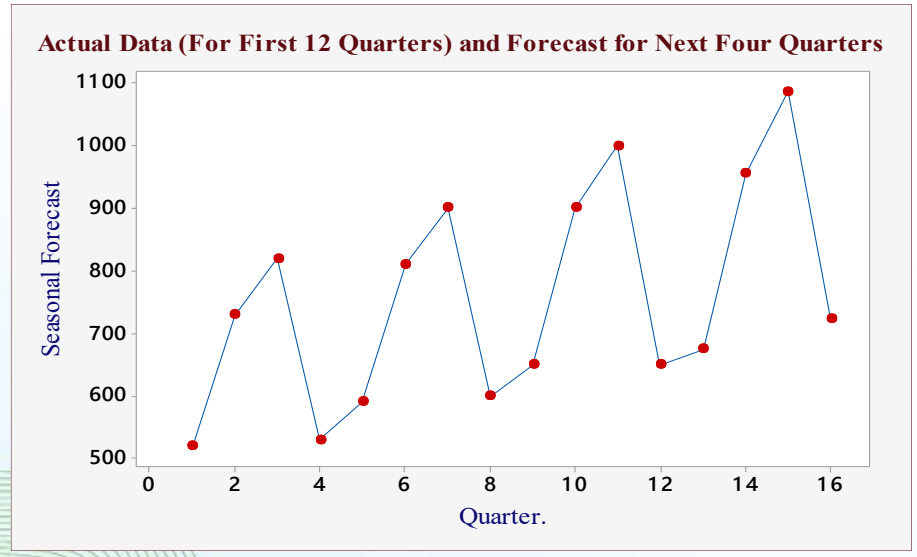


Figure 7.1: Possible Linear Relationship between E(y) and x in Simple Linear Regression

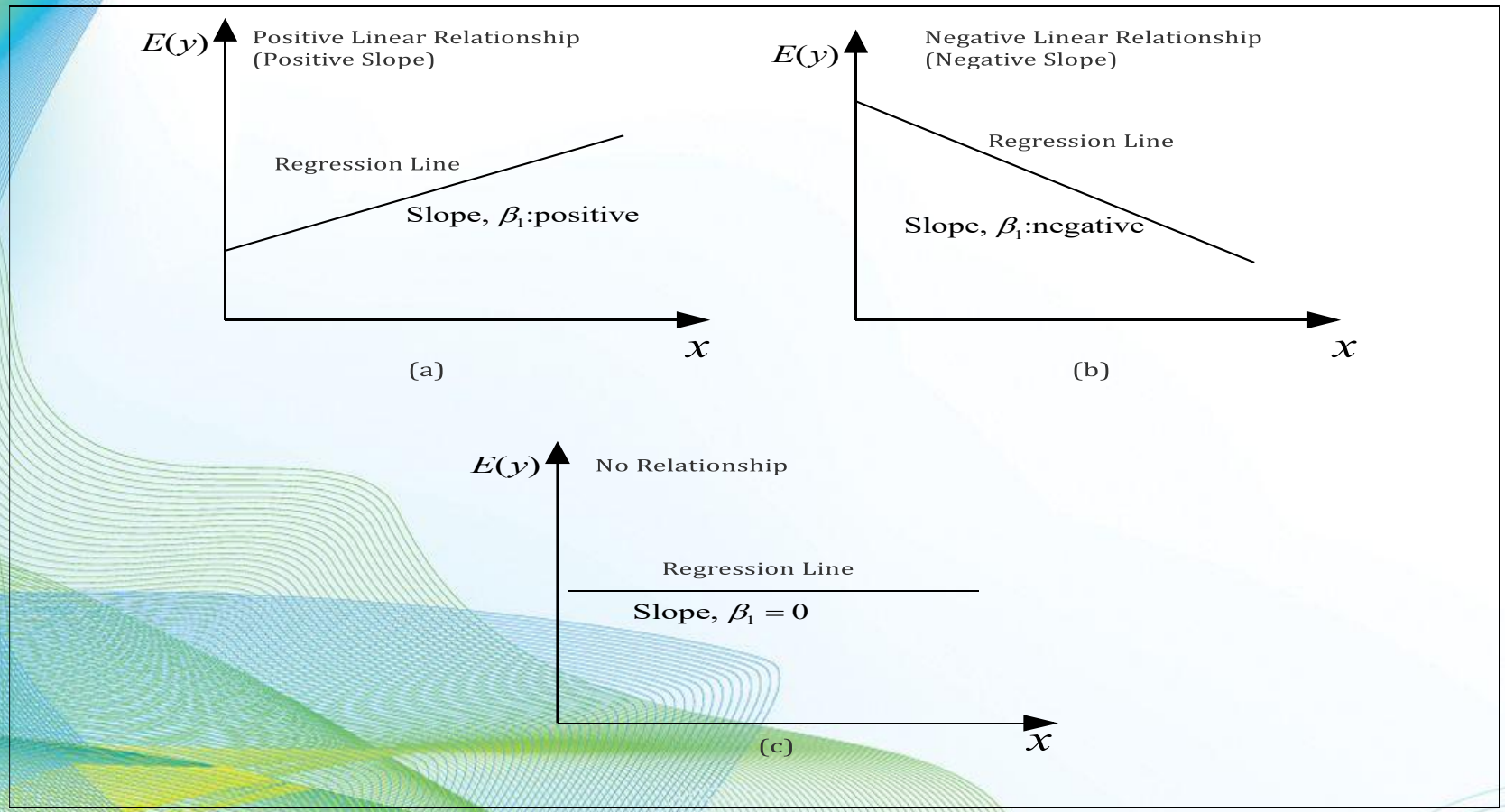


Figure 7.2: Estimating the Regression Equation

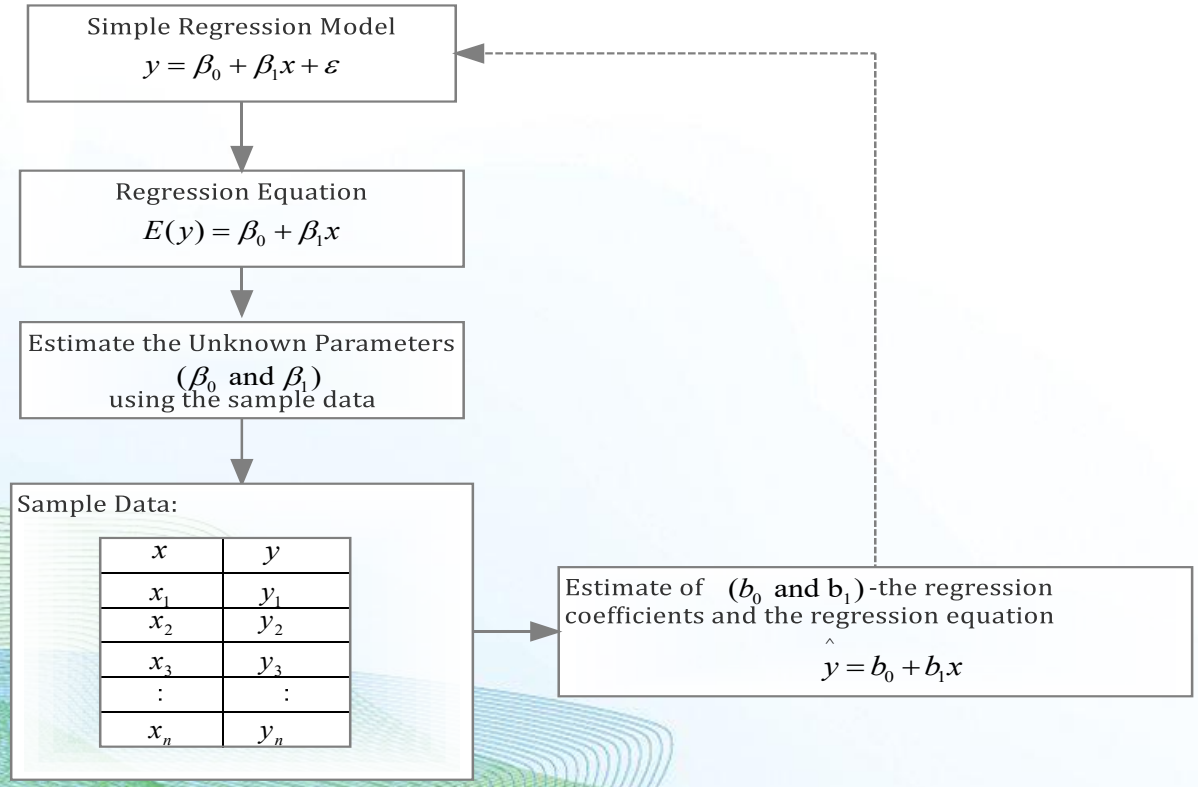


Figure 7.3: Scatterplot of Sales and Advertisement Expenditures

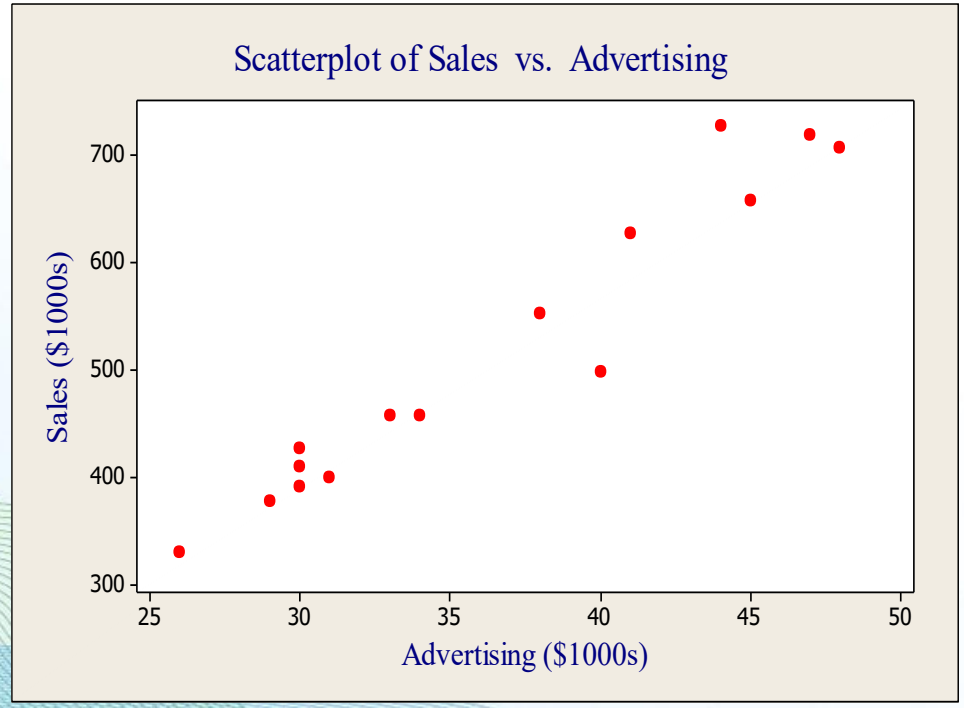


Figure 7.4: Fitting the Regression Line to the Sales and Advertising Data of Table 7.1

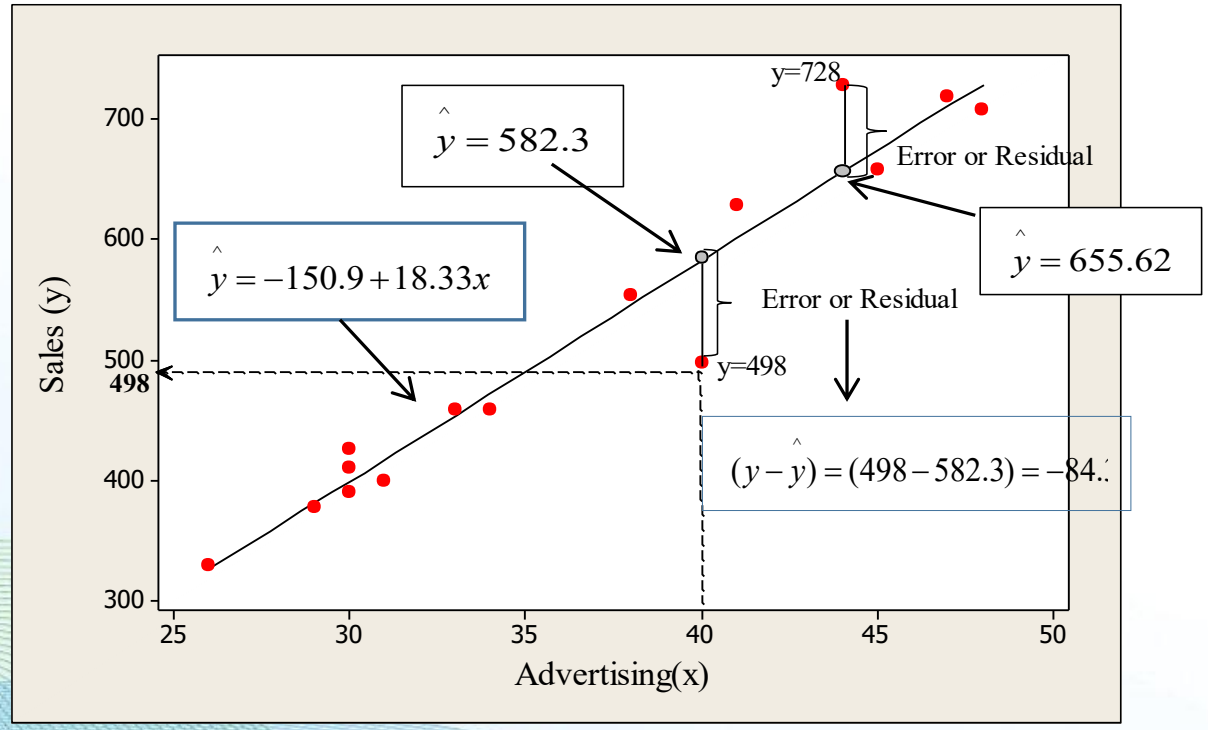


Figure 7.5: Graph of the Estimated Regression Equation

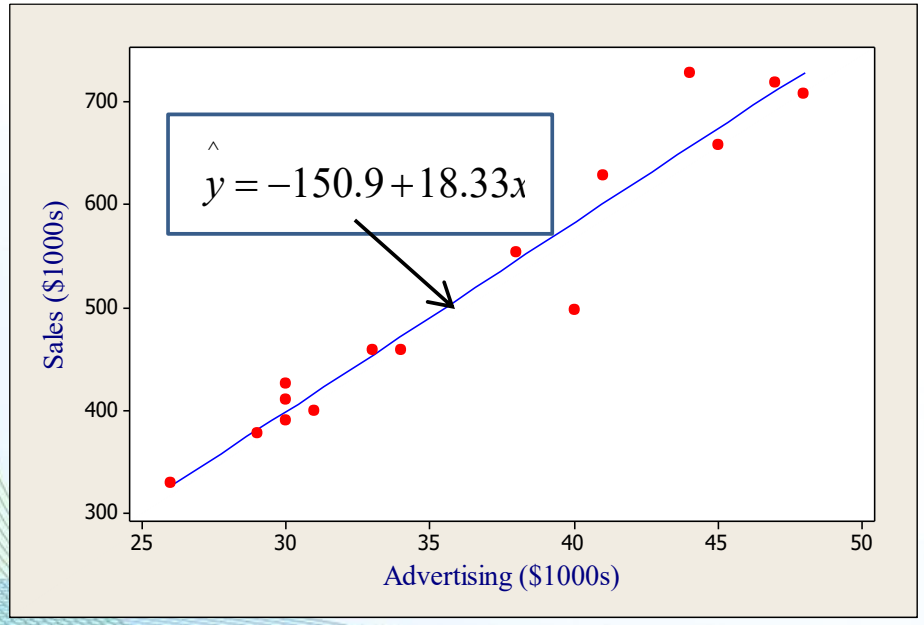


Figure 7.6: Scatter Plot of Hours (y) and Units (x)

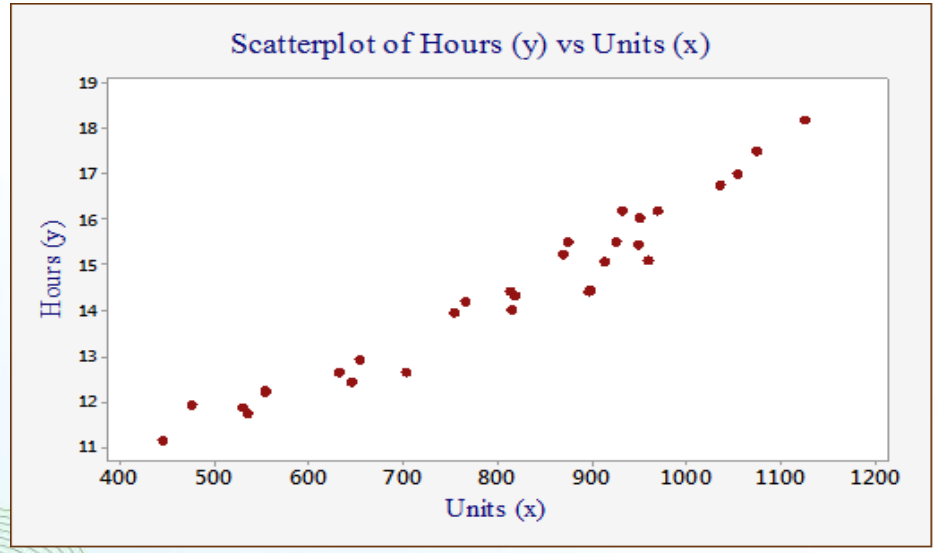


Figure 7.7: The Least Squares Line and Residuals

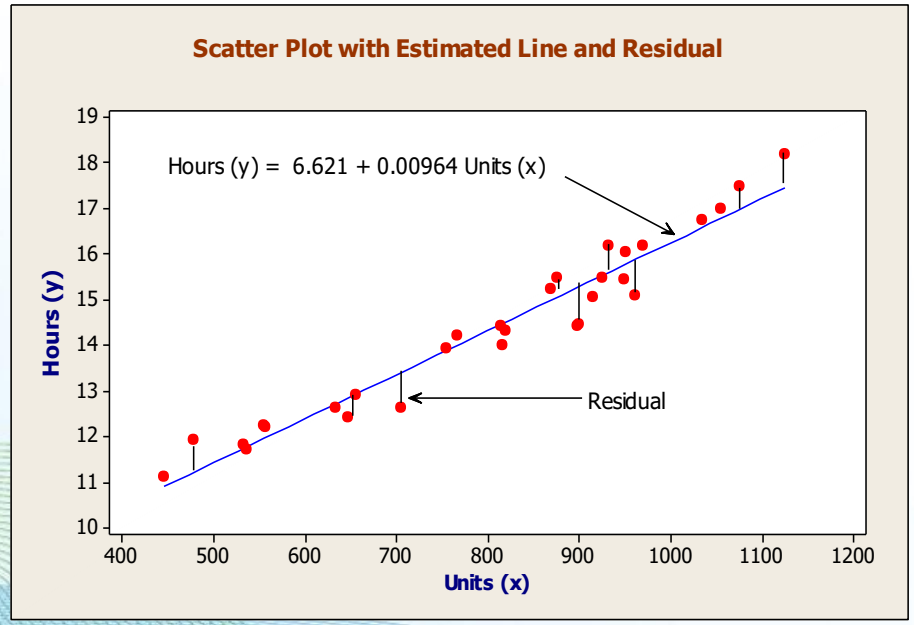


Figure 7.8: Fitted Line Regression Plot

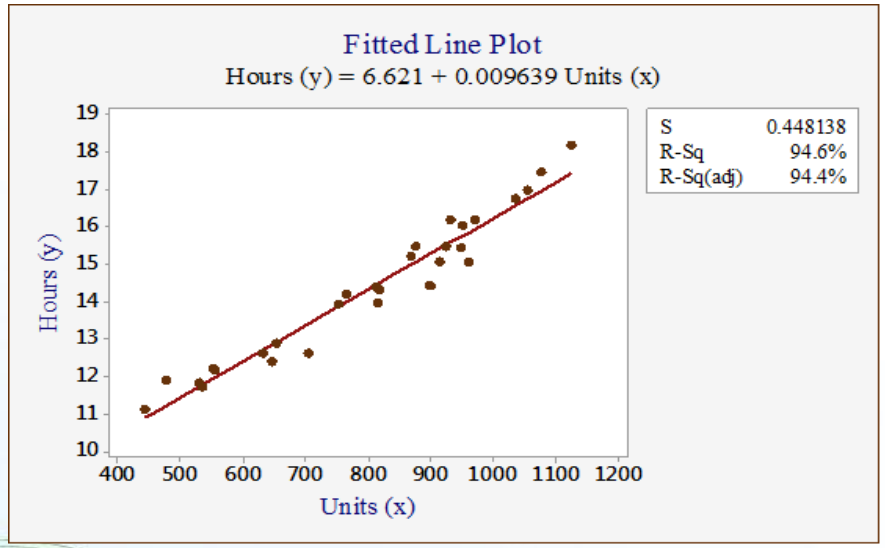
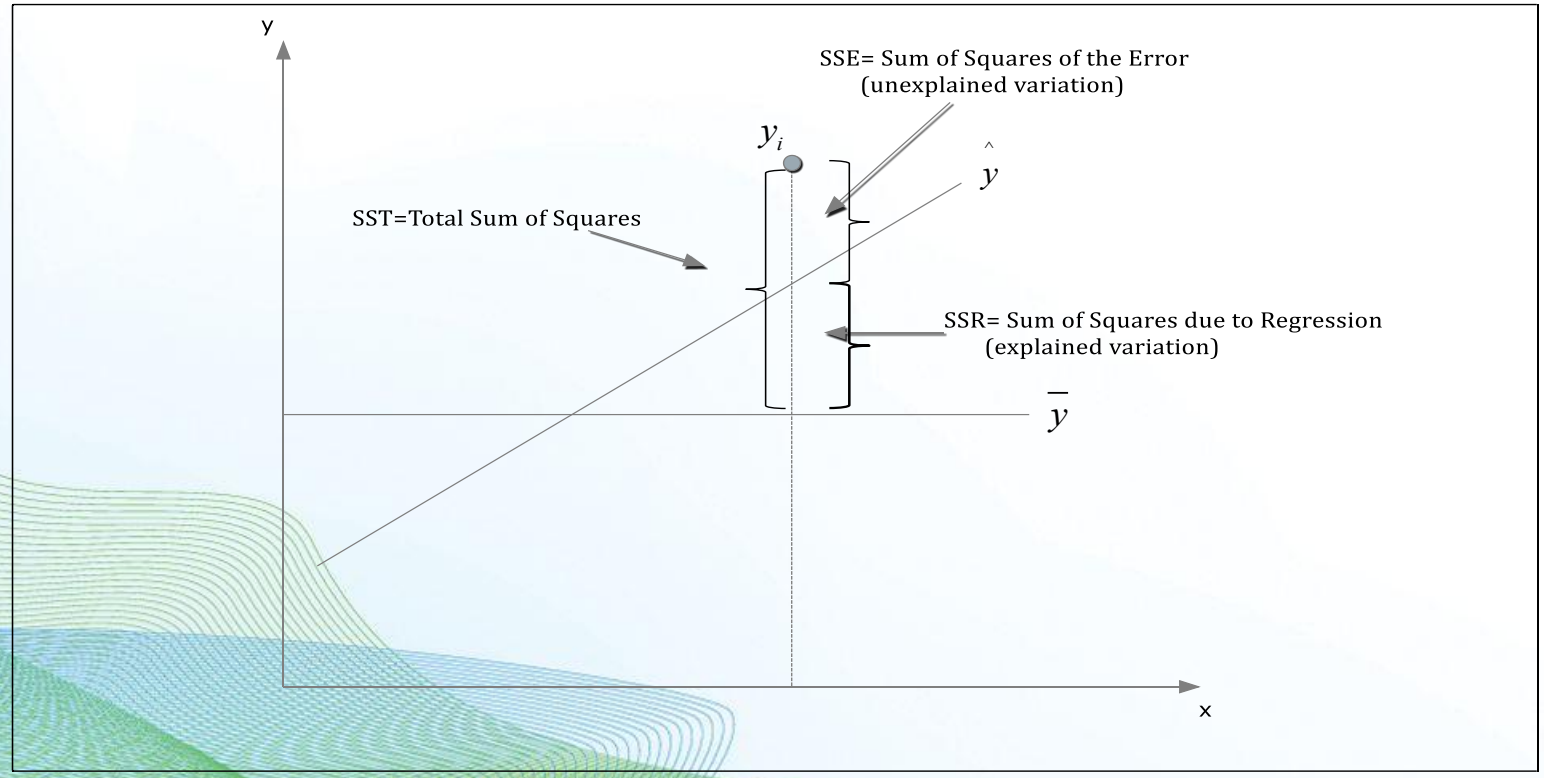


Figure 7.9: SST = SSR+SSE



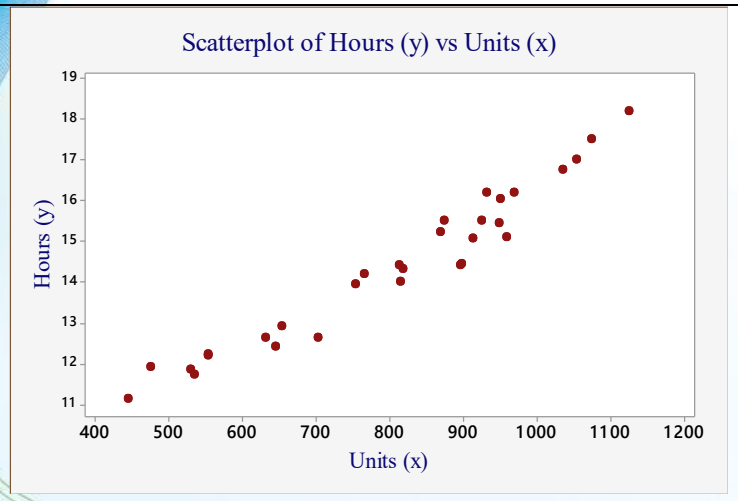


Figure 7.10: Scatterplot of Hours (y) and Units (x)

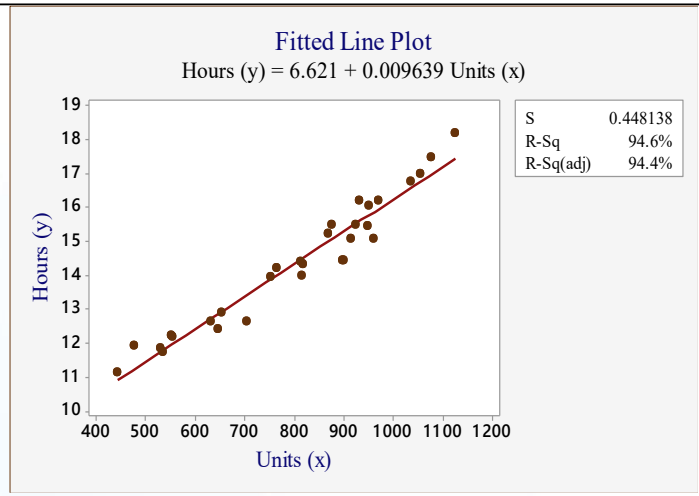


Figure 7.11: Fitted Line and Regression Equation

Figure 7.12: The Least Squares Line and Residuals

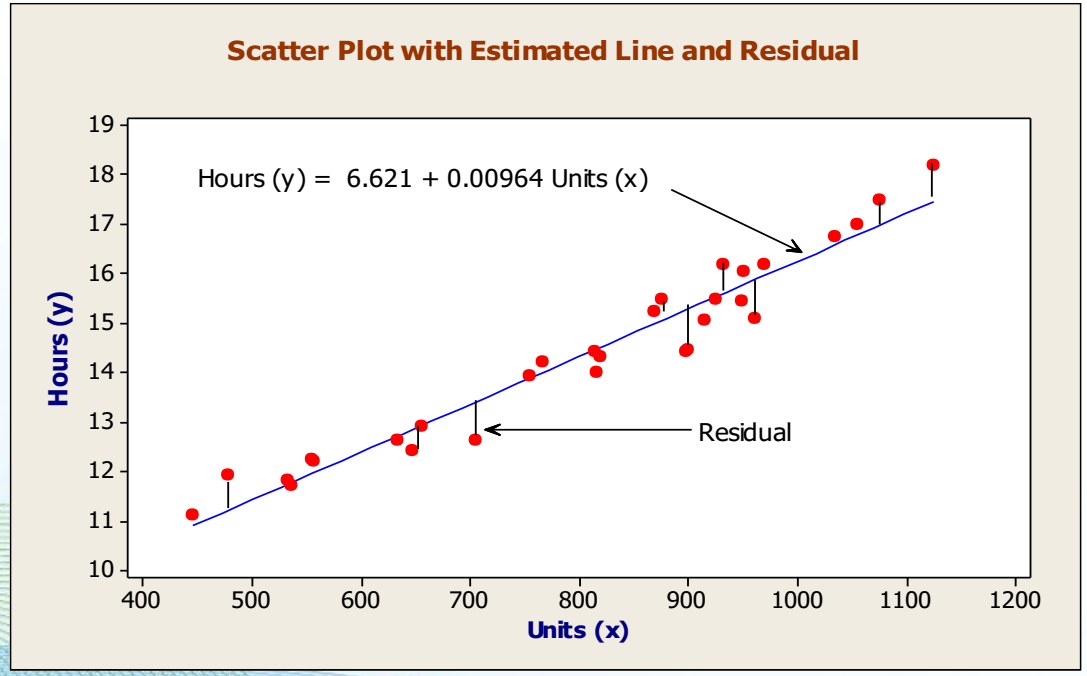


Figure 7.13: Plots for Residual Analysis

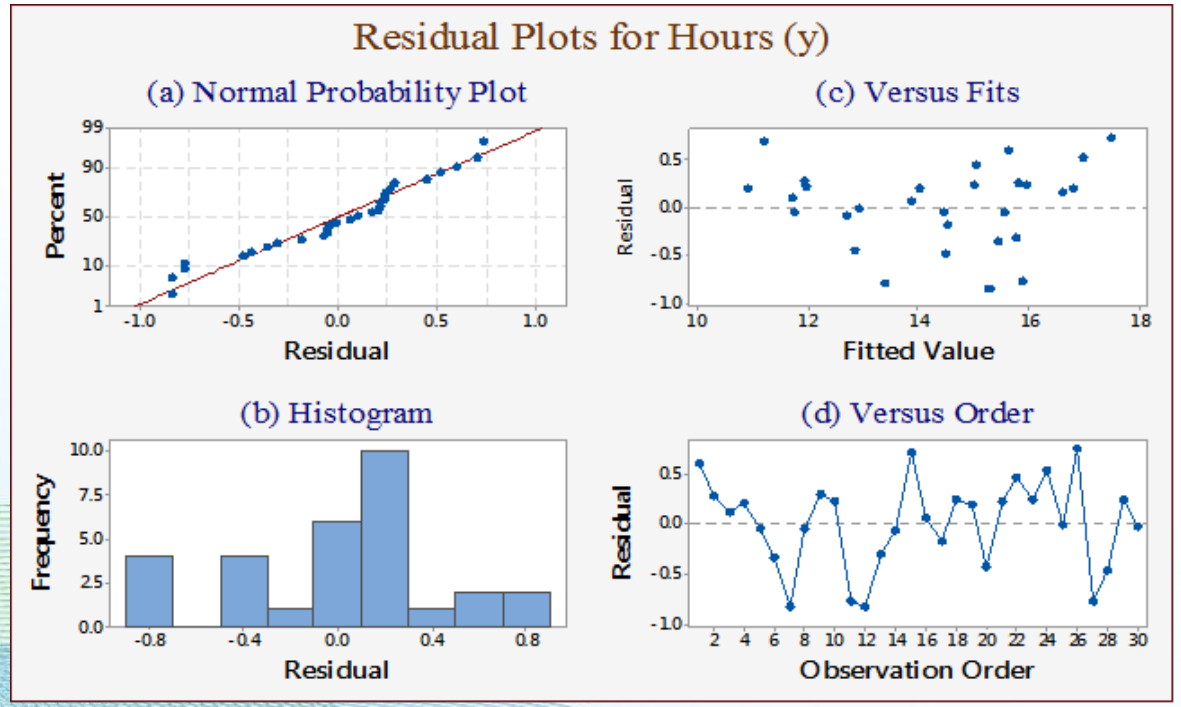


Figure 7.14: Scatter Plot and Regression Plane with Two Independent Variables

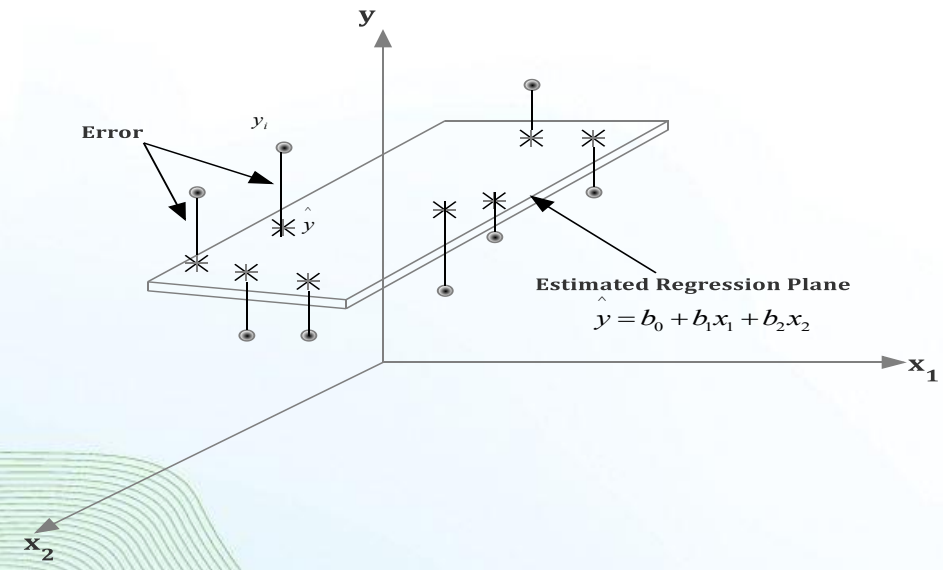


Figure 7.15: Process of Estimating the Multiple Regression Equation

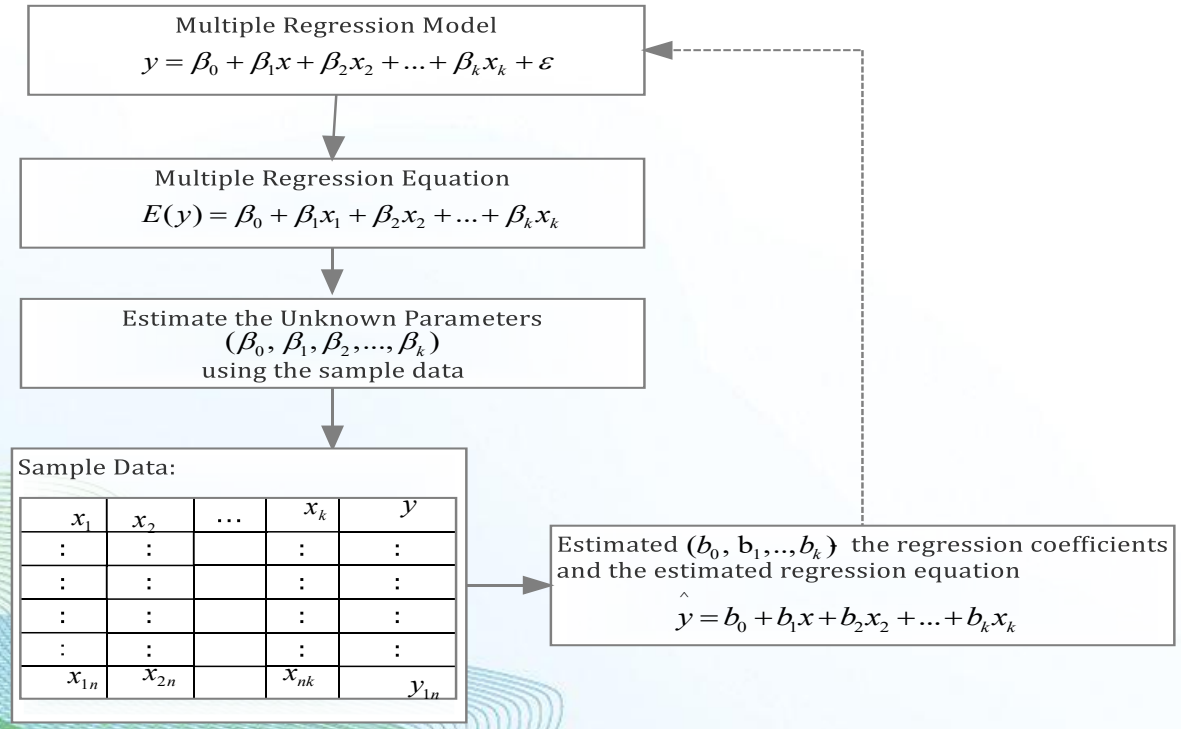


Figure 7.16: A Multiple Regression Model with Two Quantitative Variables

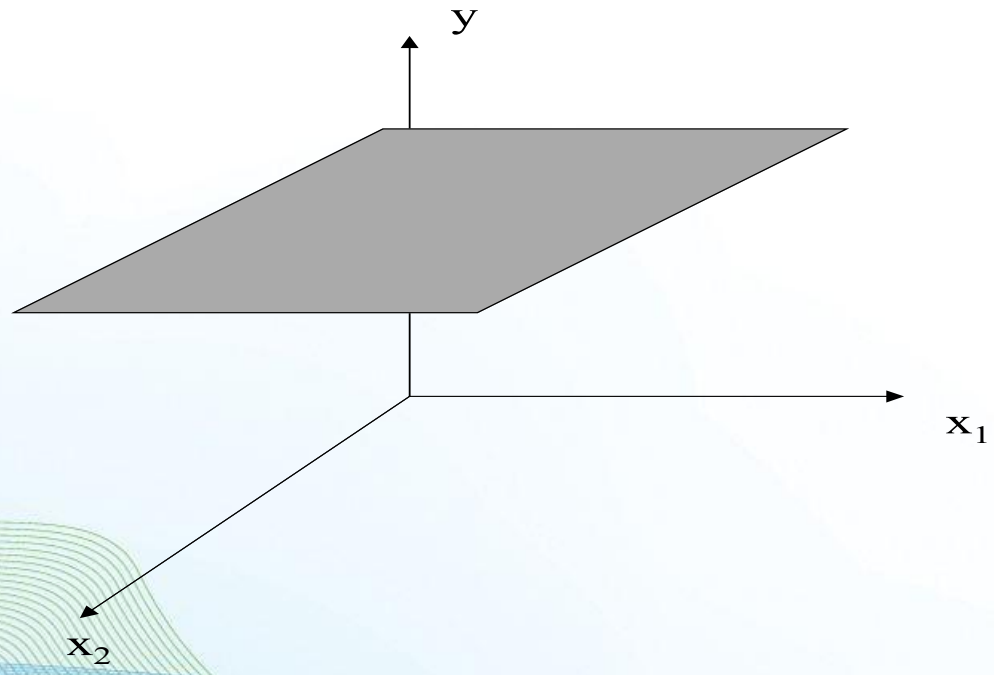


Figure 7.17: Matrix Plot of Each versus Each

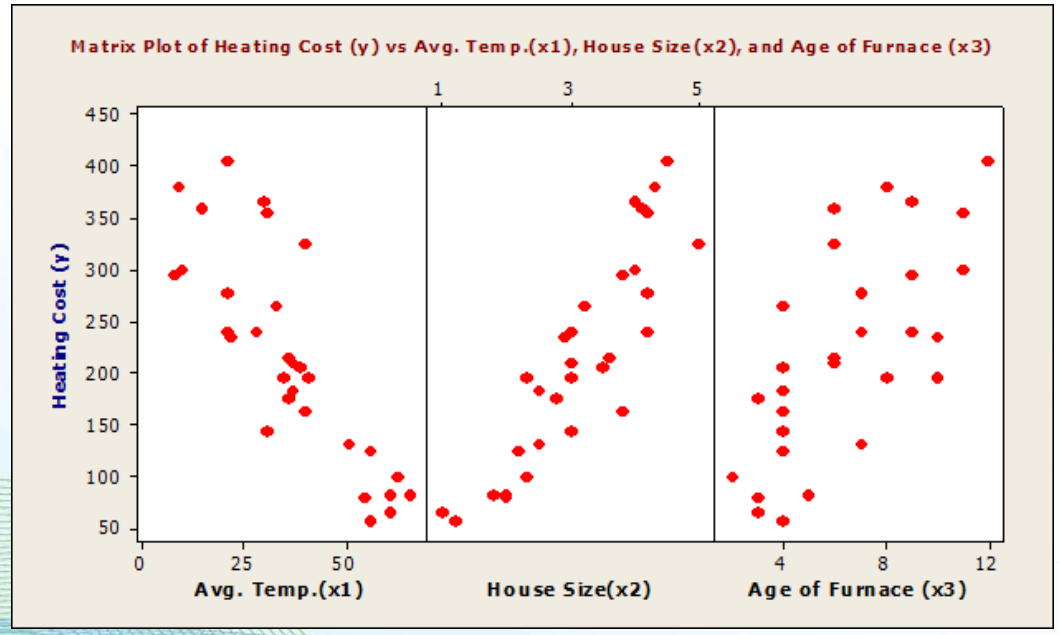


Figure 7.18: Matrix Plot

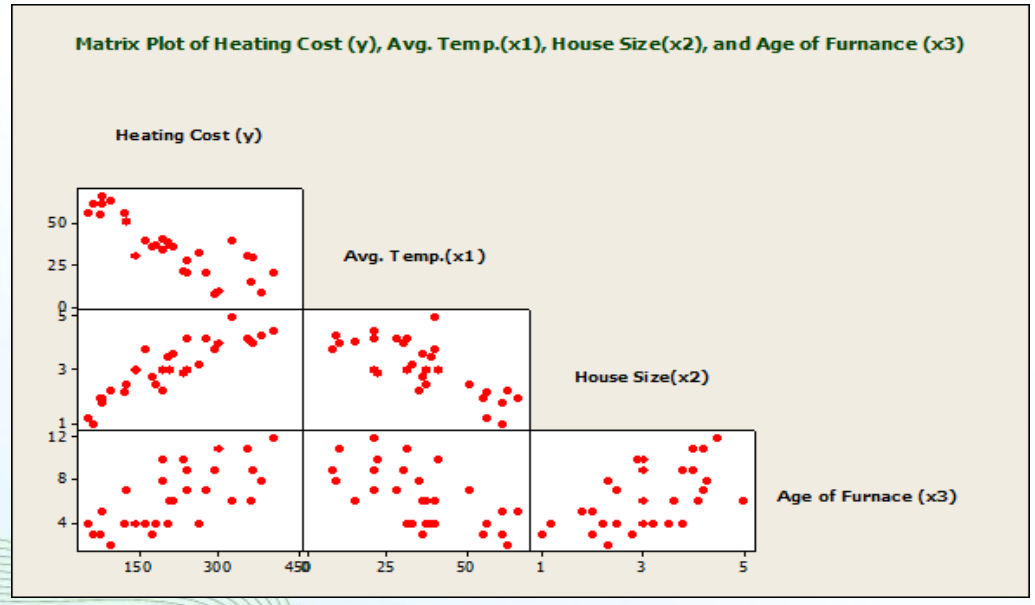


Figure 7.19: The Second Order Model

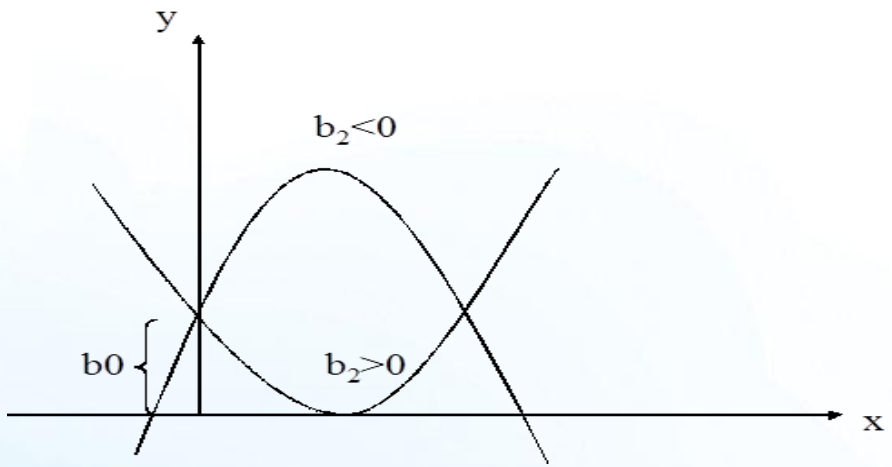
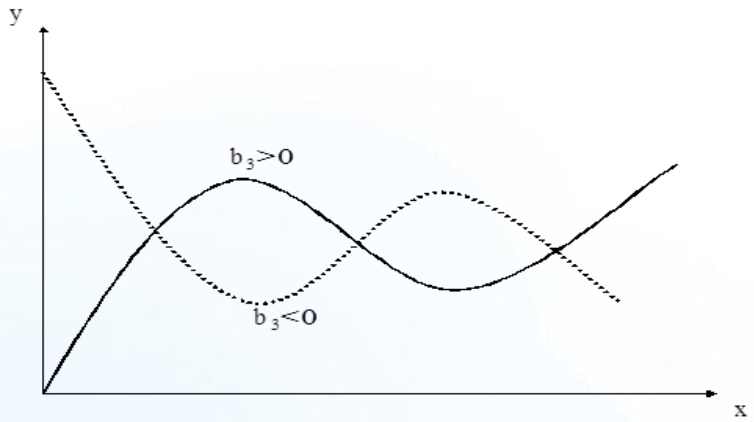


Figure 7.20: The Third-order Model



[Figure 7.21 here]

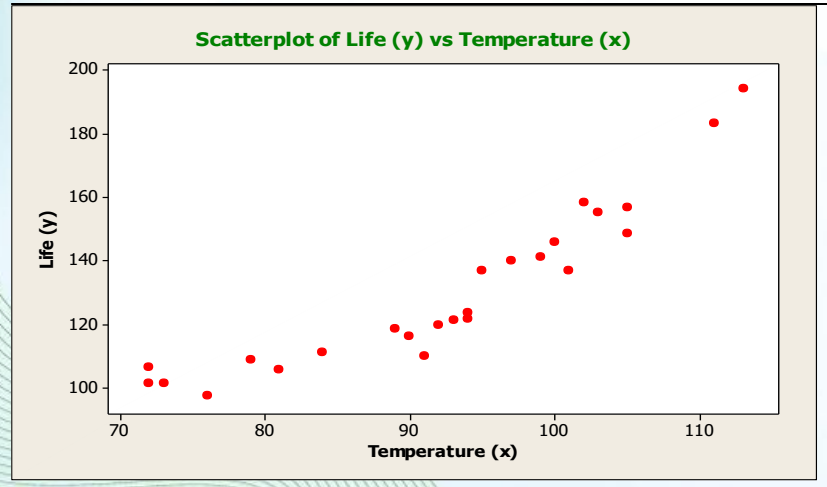


Figure 7.21: Scatter Plot of Life (y) vs. Operating Temp. (x)

[Figure 7.22here]

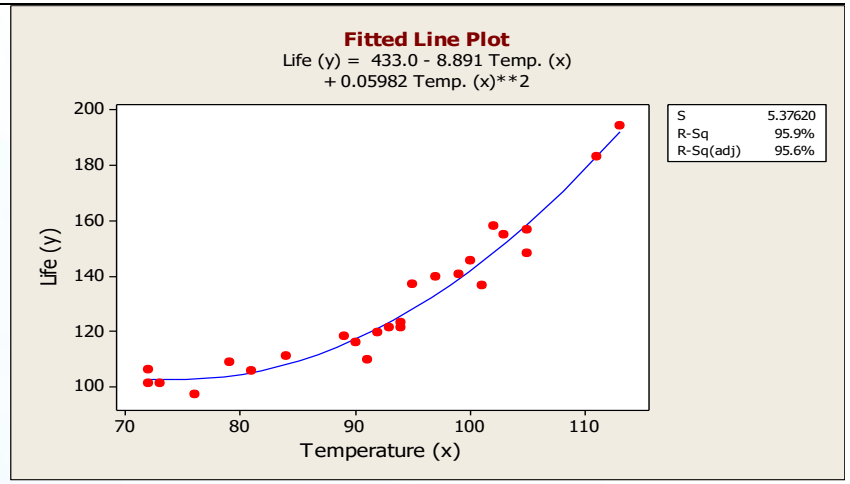


Figure 7.22: Regression Plot with Equation

Figure 7.23: Residual Plots for the Quadratic Model Example

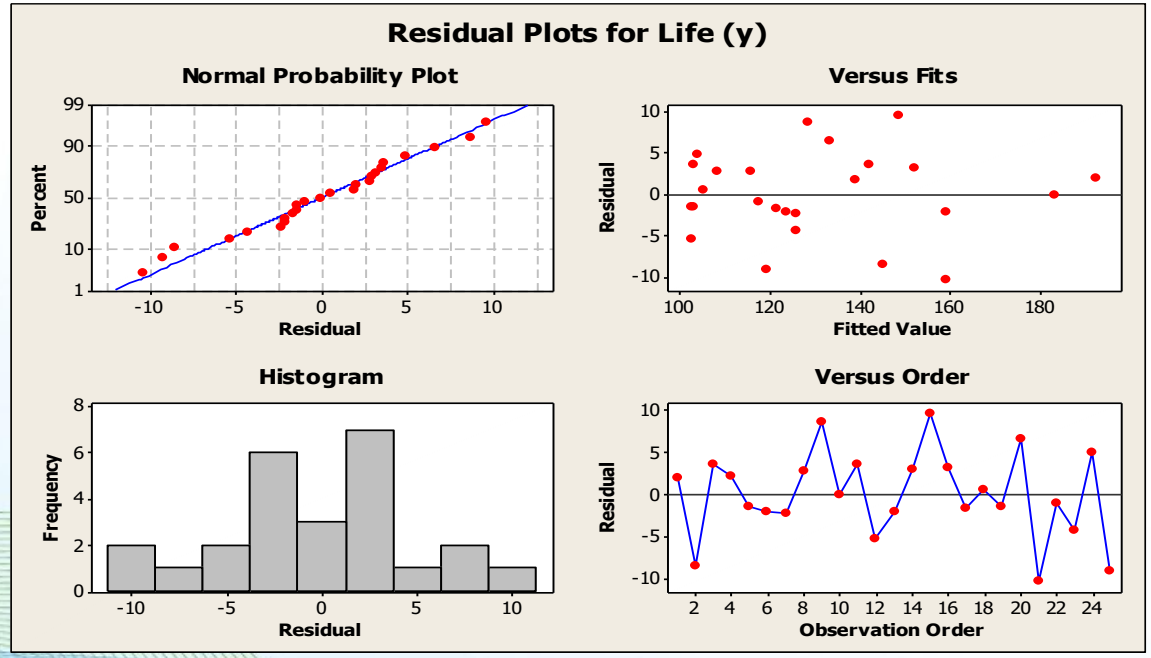


Figure 7.24: Fitted Line Plot showing the Yield of a Chemical Process

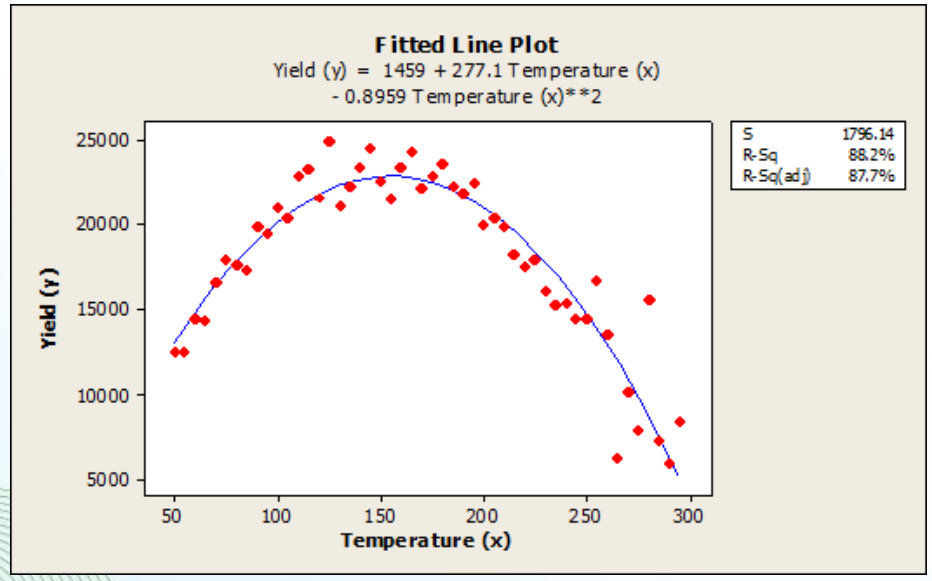


Figure 7.25: Mean Salary of Female and Male Employees

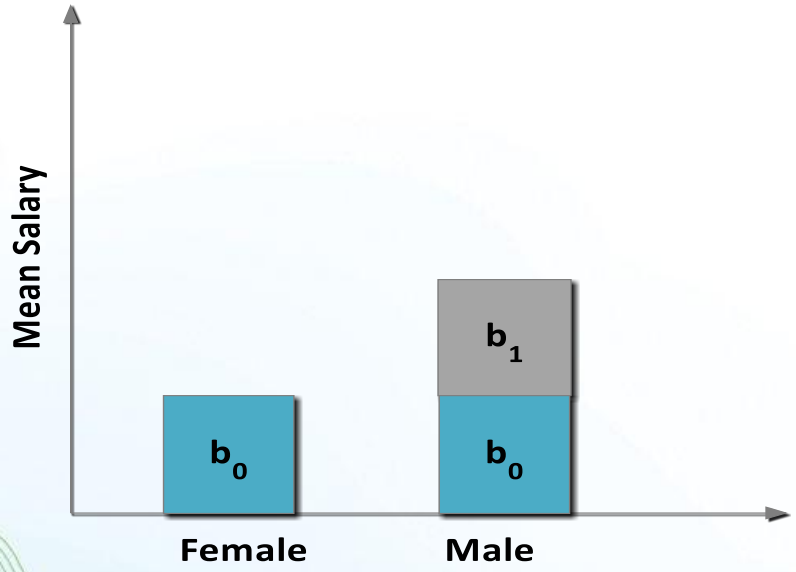


Figure 7.26: Bar Chart Showing the Mean Profit for Three Locations A, B, C

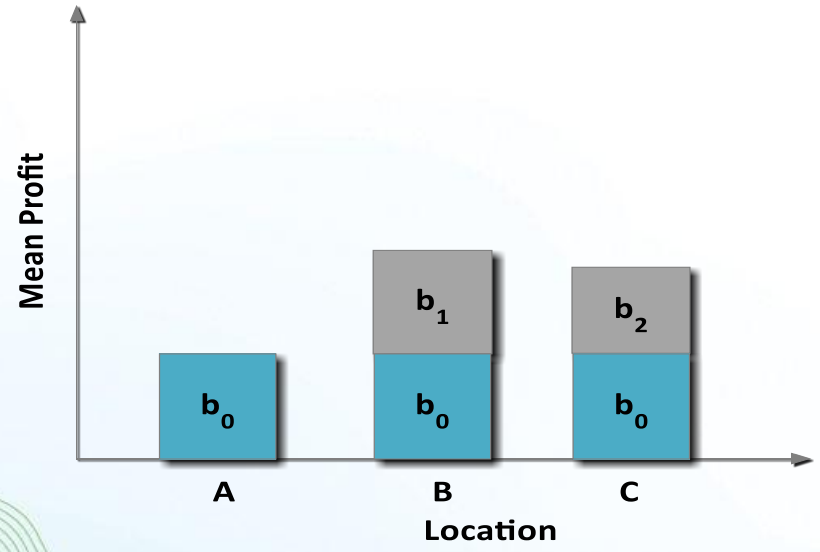
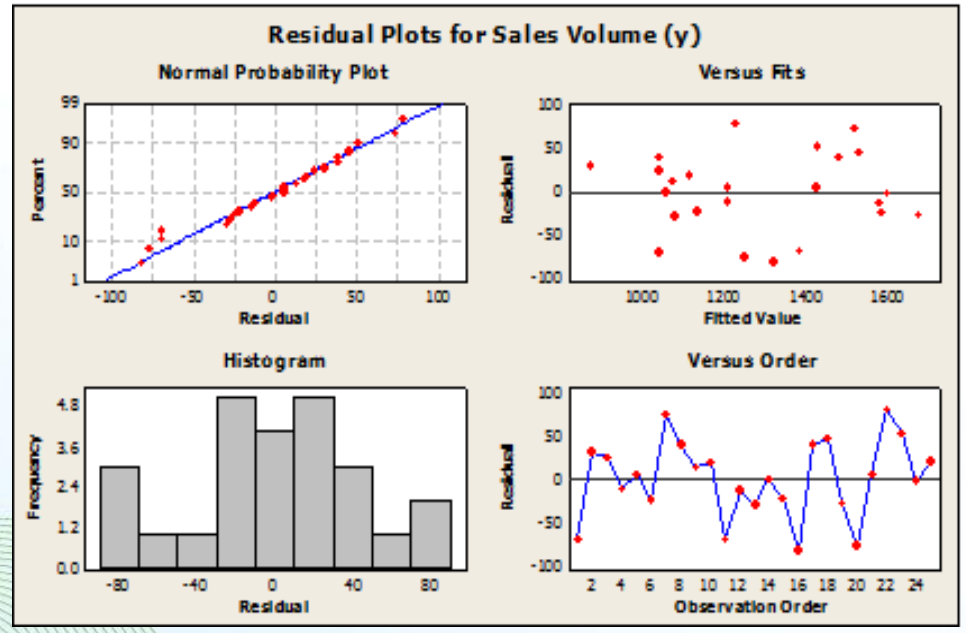
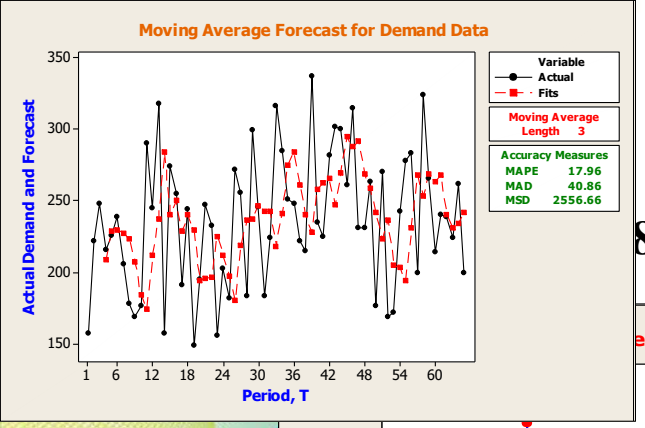


Figure 7.27: Residual Plots for the Dummy Variable Example





8.1 here]

[Figure 8.2 here]

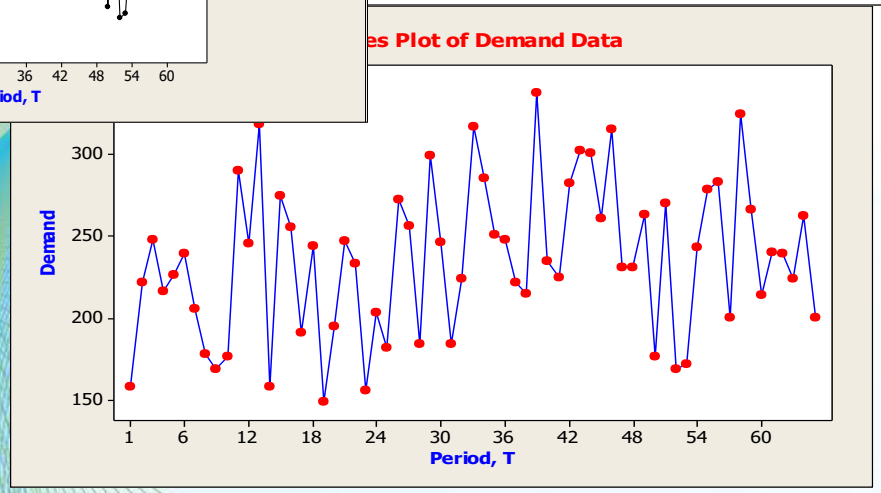


Figure 8.1: A Constant (stable process)

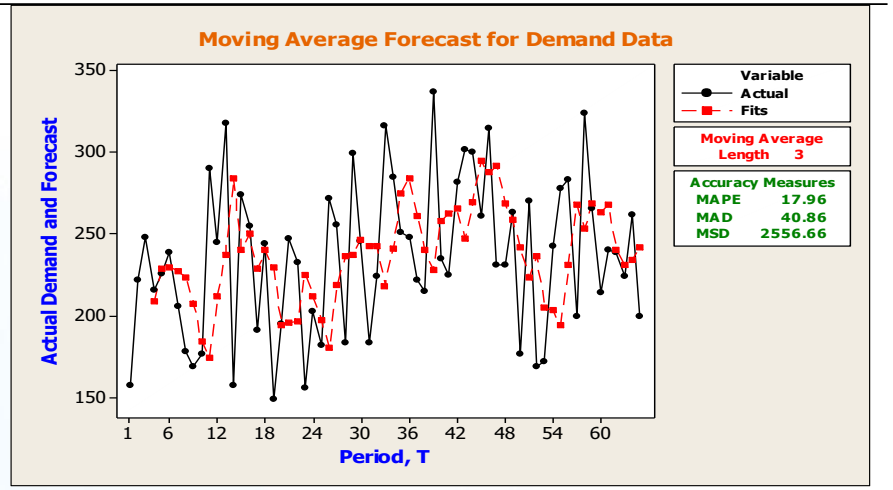


Figure 8.2: Forecast for the Demand Data in Figure 8.1 (forecasts are dotted lines)

[Figure 8.3 here]

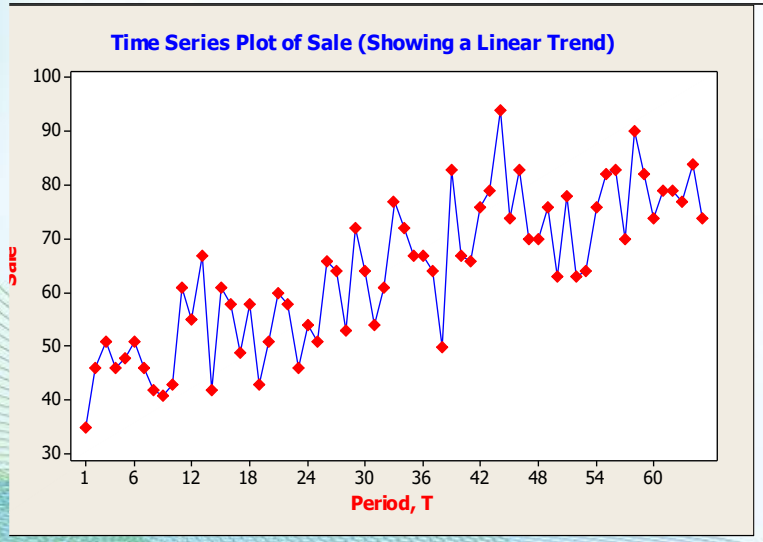


Figure 8.3: A Linear Trend Process

[Figure 8.4 here]

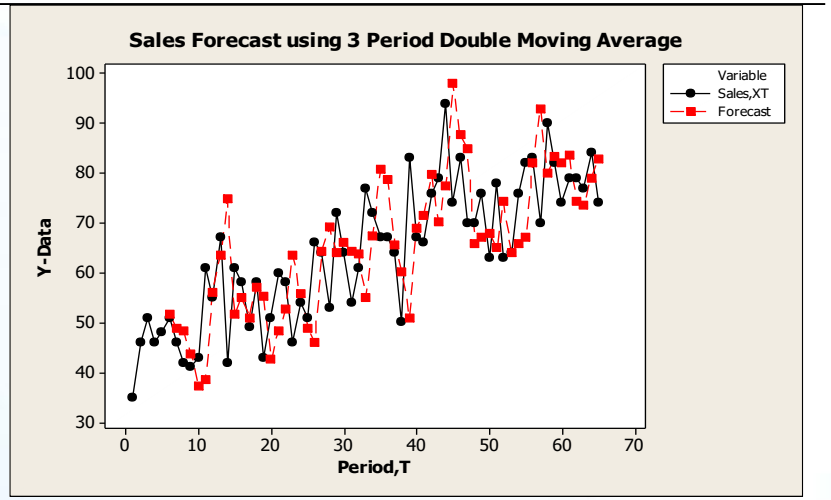


Figure 8.4: Forecast for the Sales Data in Figure 8.3 using Double Moving Average

Figure 8.5: Data Showing Seasonal Pattern

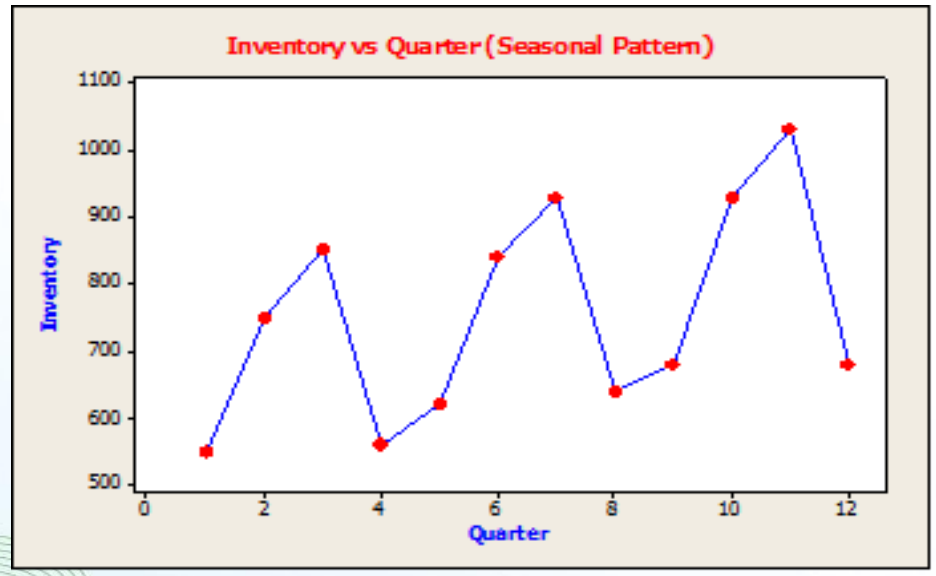


Figure 8.6: Linear Trend Model

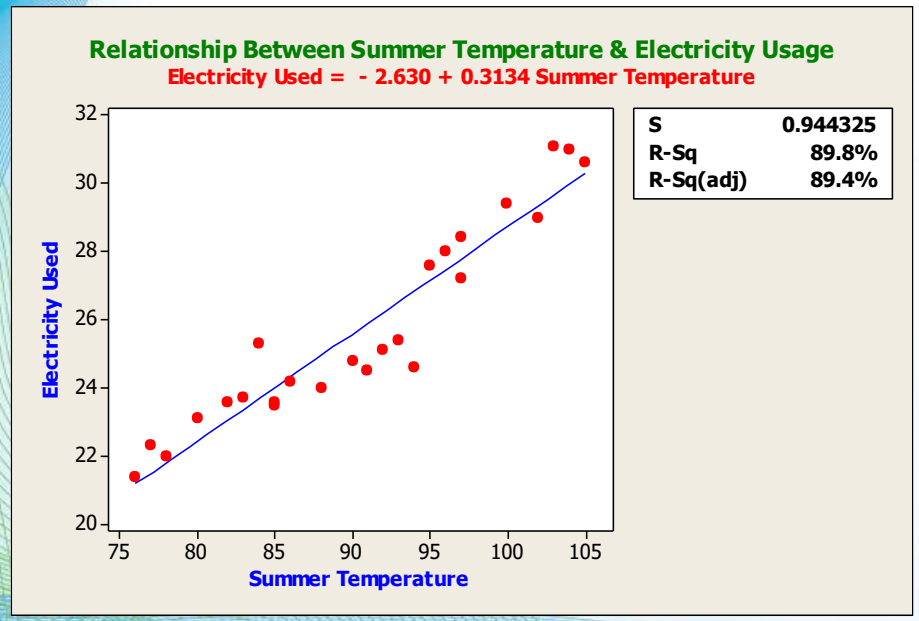


Figure 8.7: Nonlinear Relationship (Quadratic Model)

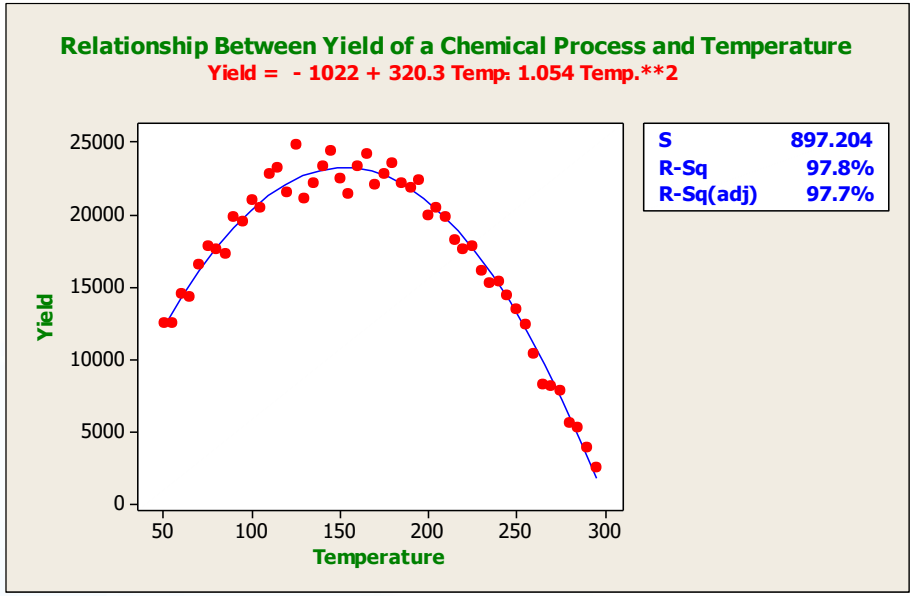


Figure: 8.8: Time Series Plot of Demand Data

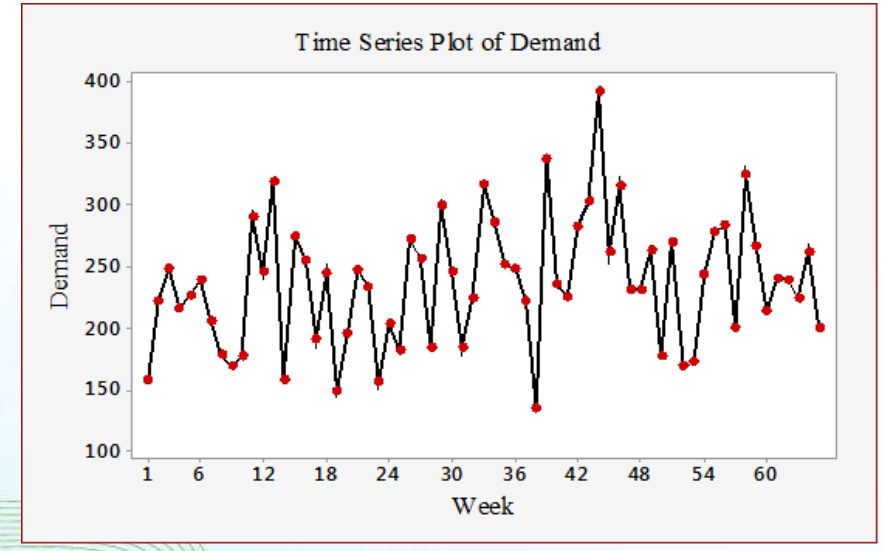


Figure 8.9: Plot of Actual Data and Six Period Moving Average Forecast

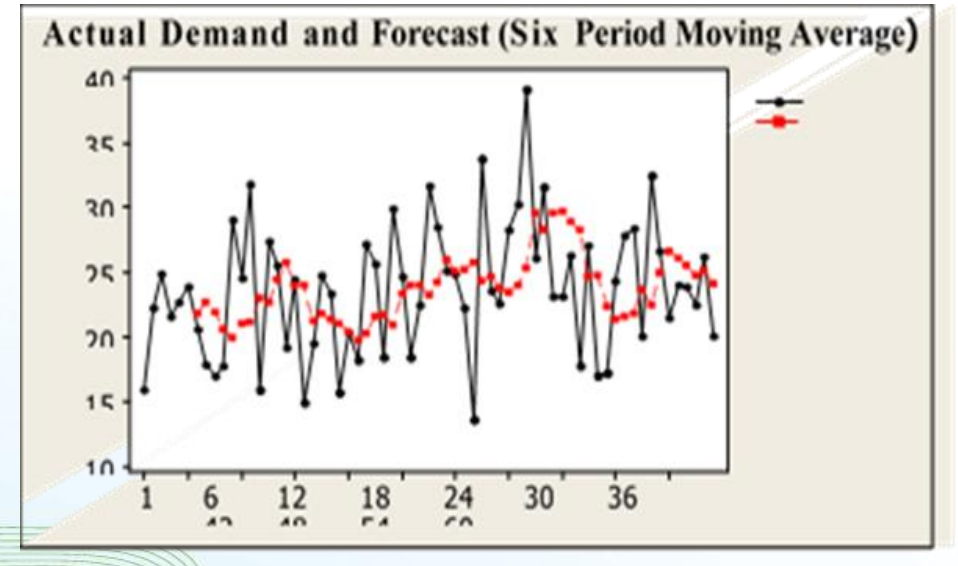


Figure 8.10: Plot of Actual Data and Three Period Moving Average Forecast

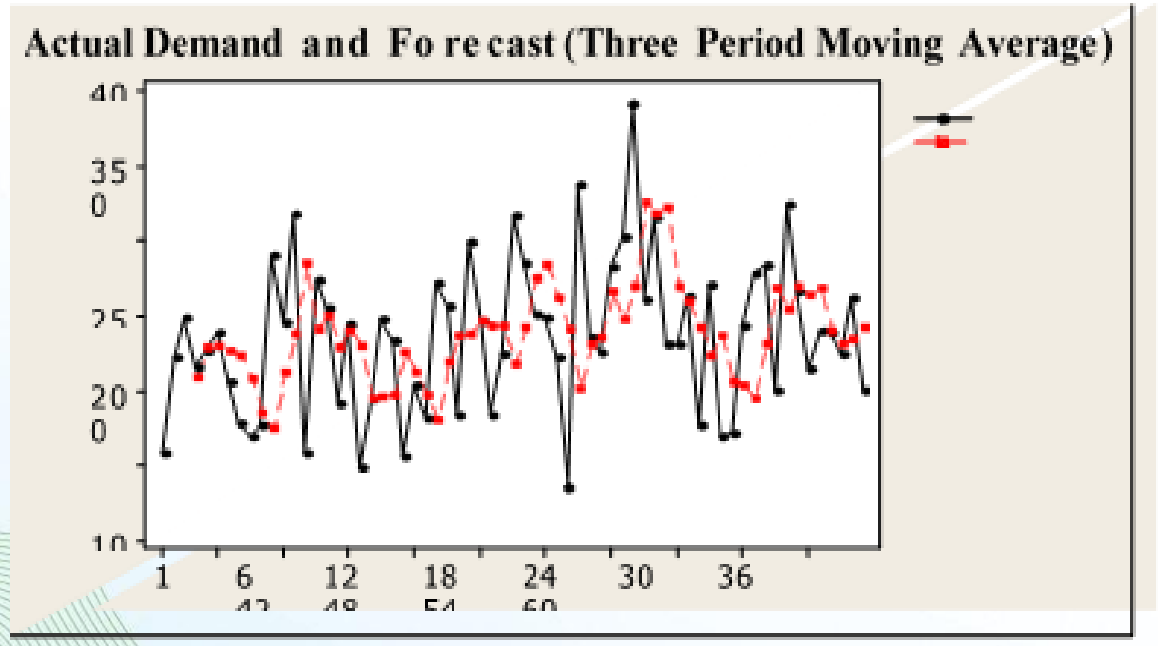


Figure 8.11: 4-period simple moving average and 4-period weighted moving average forecasts

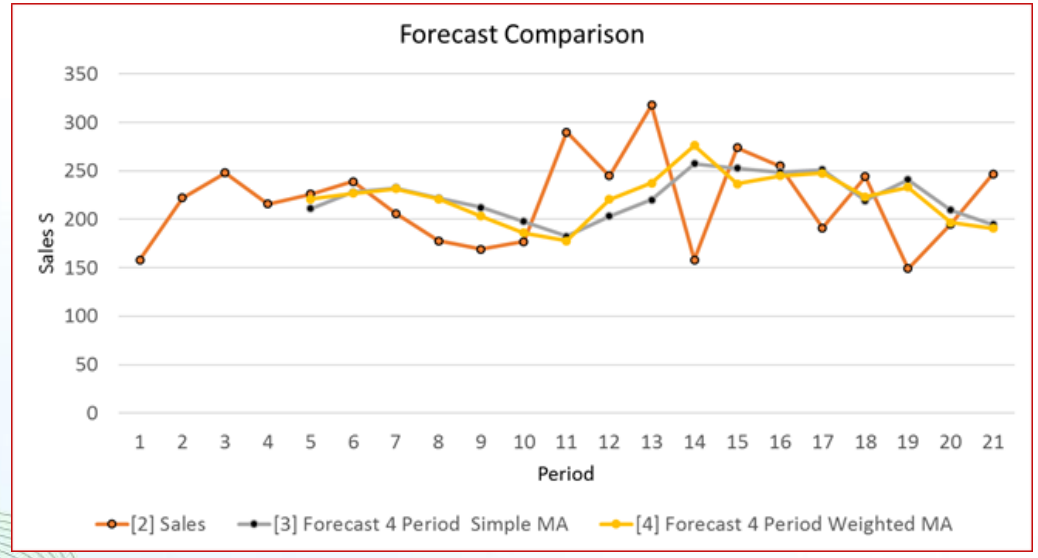
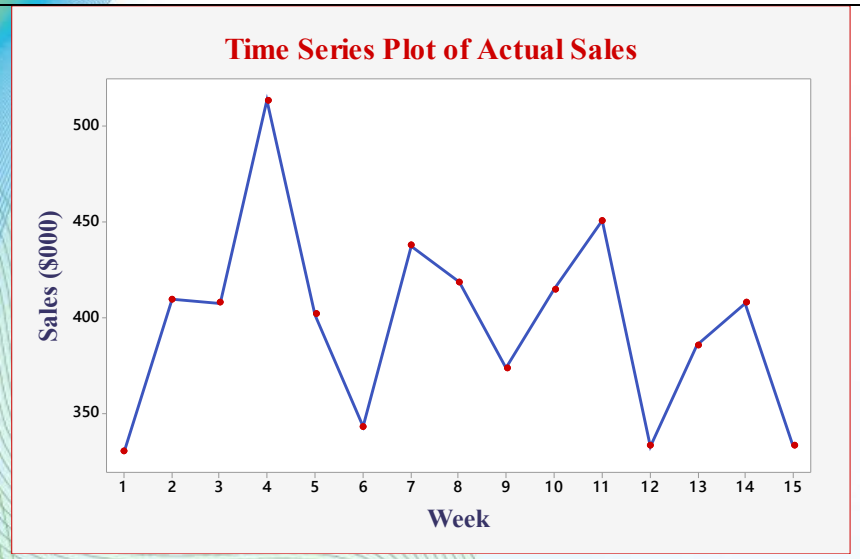


Figure 8.12: Plot of Actual Sales

Figure 8.13: Actual Sales and Forecast



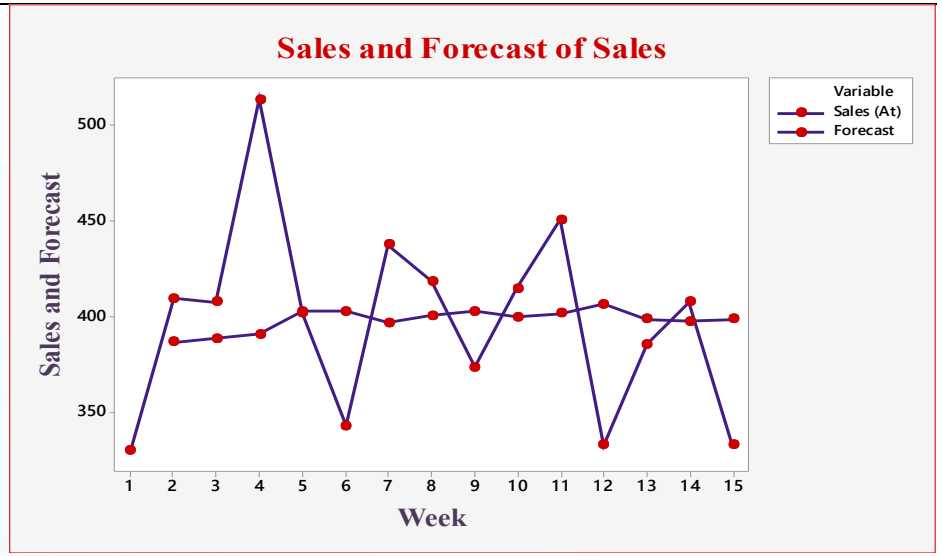


Figure 8.12: Plot of Actual Sales

Figure 8.13: Actual Sales and Forecast

Figure 8.14: Inventory demand data and the forecast

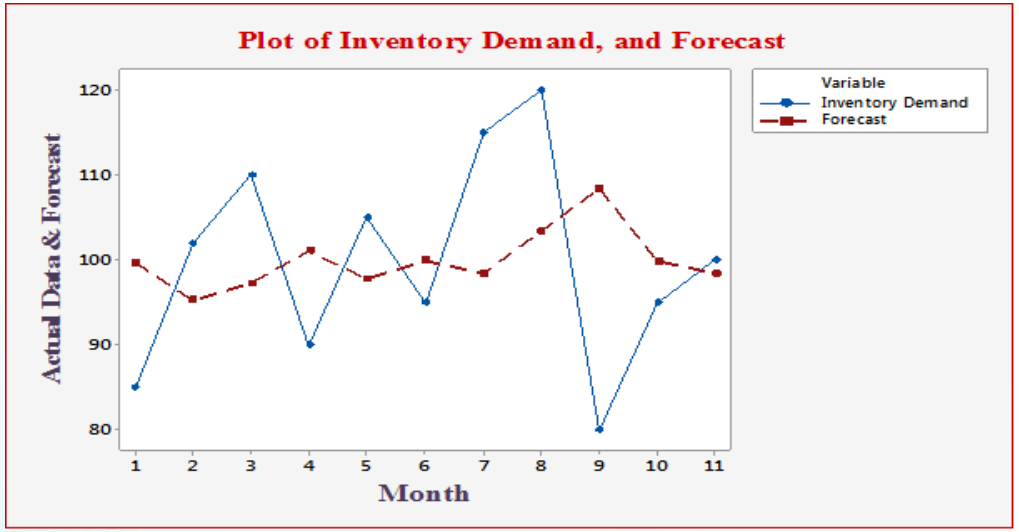
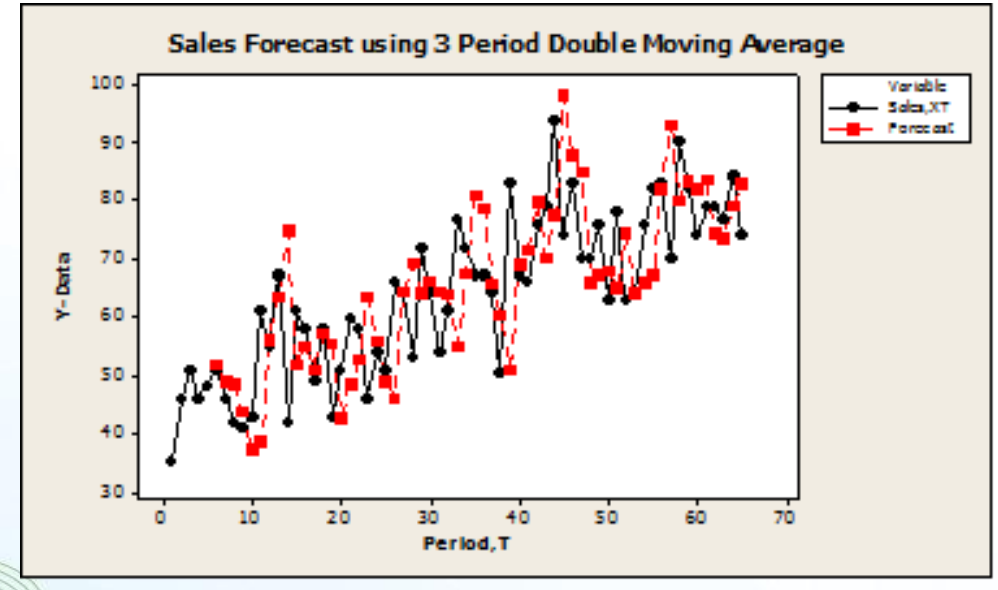


Figure 8.15: Sales and Forecast using Double Moving Average



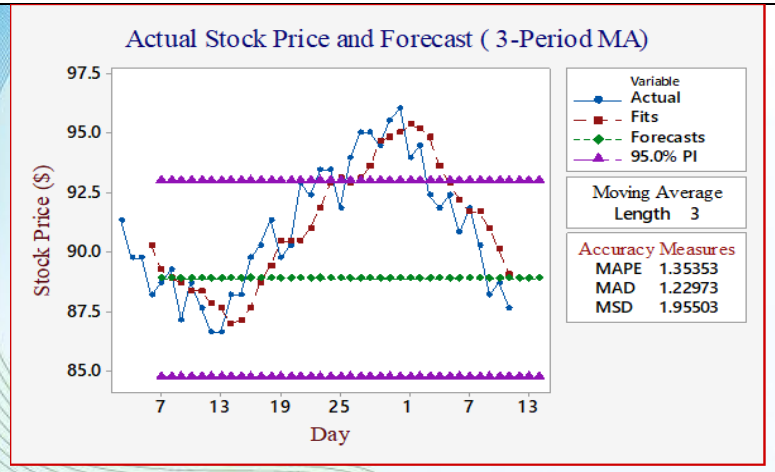


Figure 8.16: 3-Period Moving Average Forecast of Stock Price

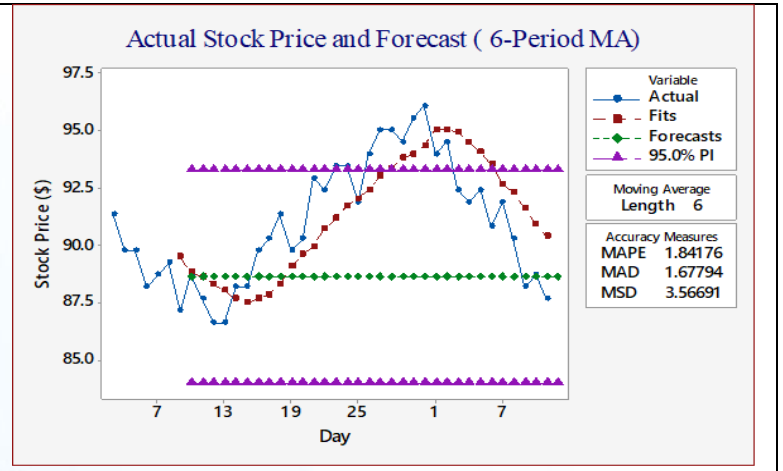


Figure 8.17: 6-Period Moving Average Forecast of Stock Price

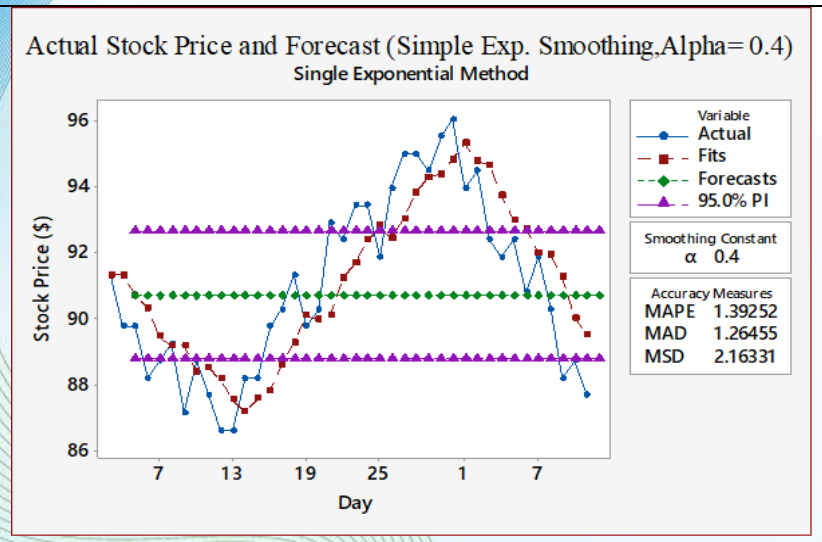


Figure 8.18: Exponential Smoothing Forecast of Stock Price $(\alpha = 0.4)$

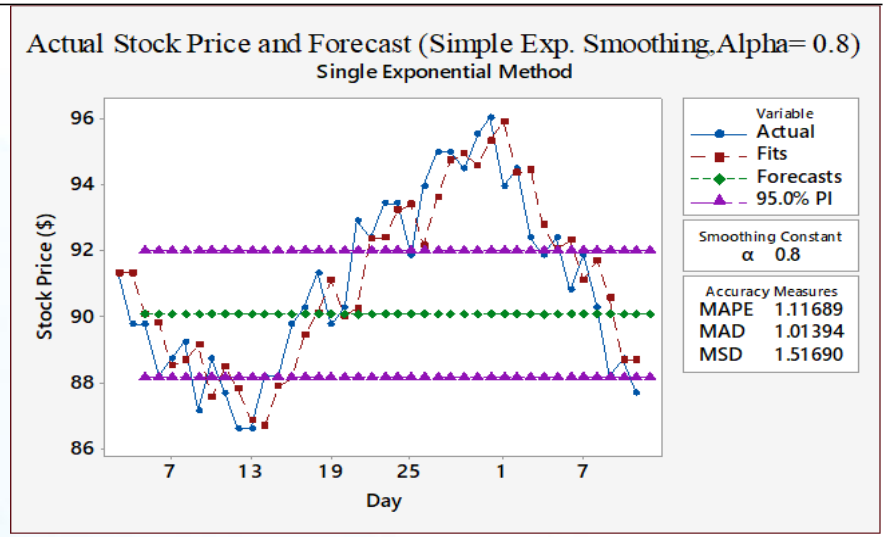


Figure 8.19: Exponential Smoothing Forecast of Stock Price $(\alpha = 0.8)$

Figure 8.20: Historical Data of Quarterly Sales

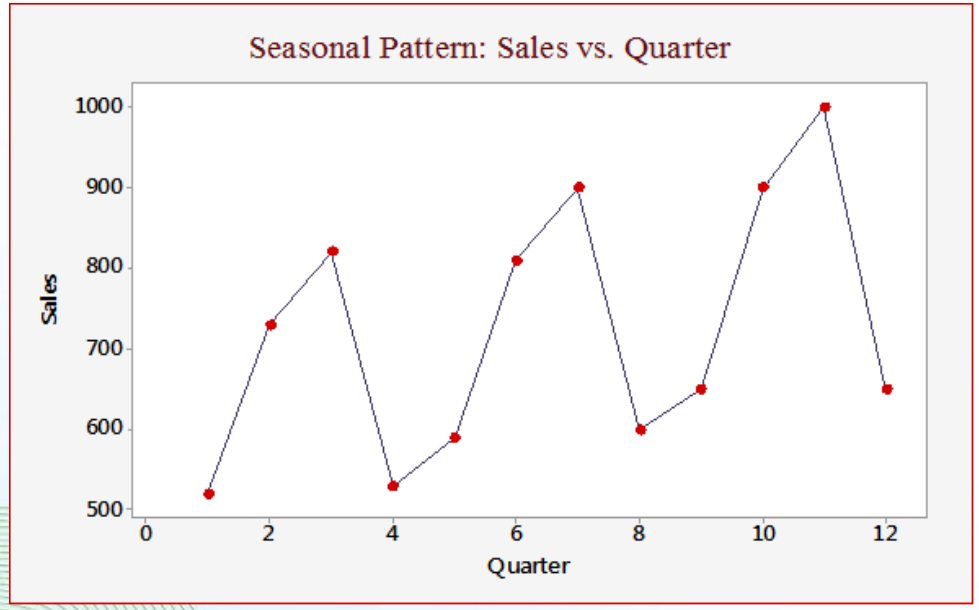


Figure 8.21: plot of deseasonlized data

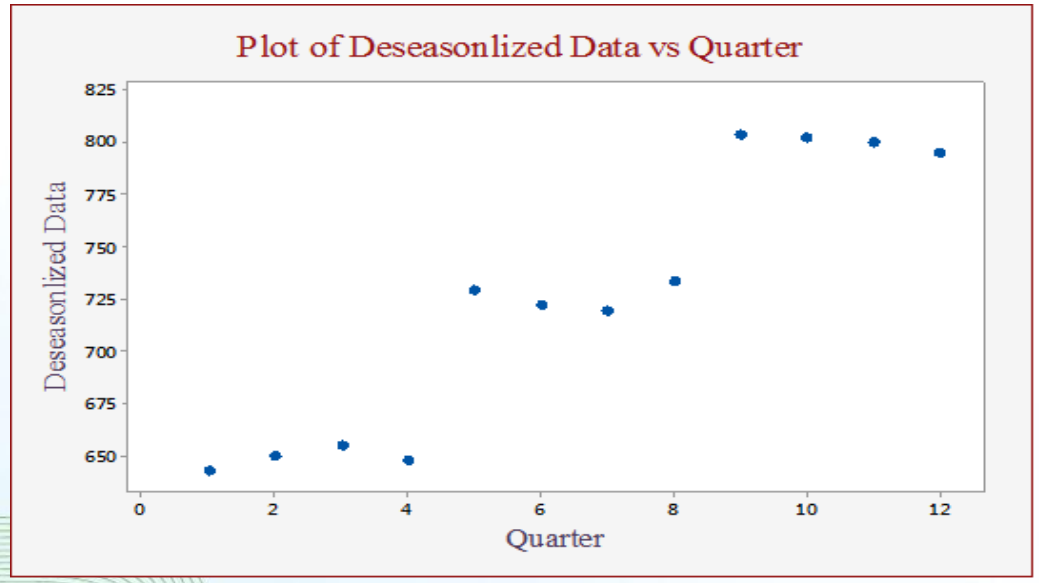


Figure 8.22: Regression on Deseasonlized Data

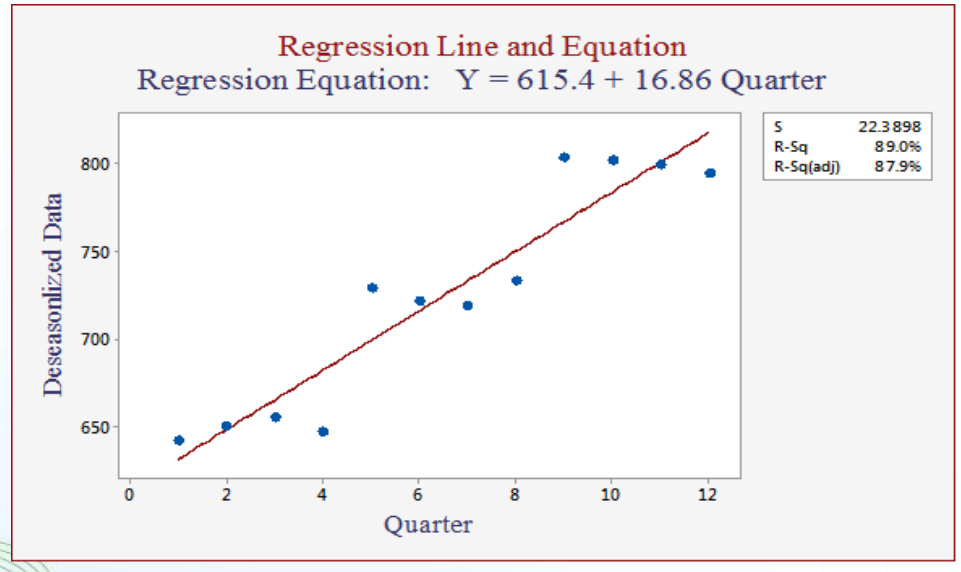


Figure 8.23: Actual Demand Data (first 12 quarters) and the Forecasts for the next Four Quarters (quarters 13 through 16)

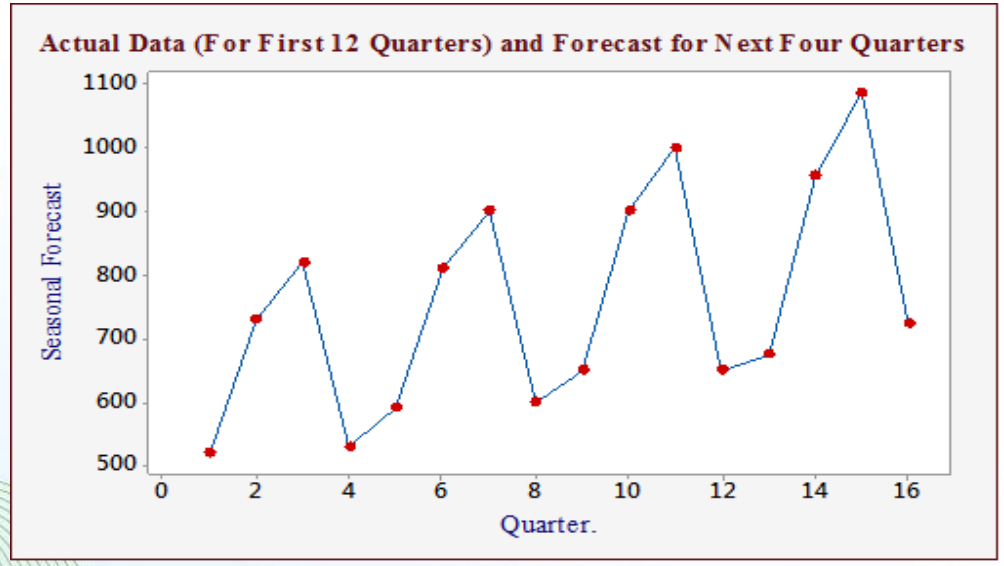


Figure 9.1: Data Mining, its Origin and Areas of Interaction

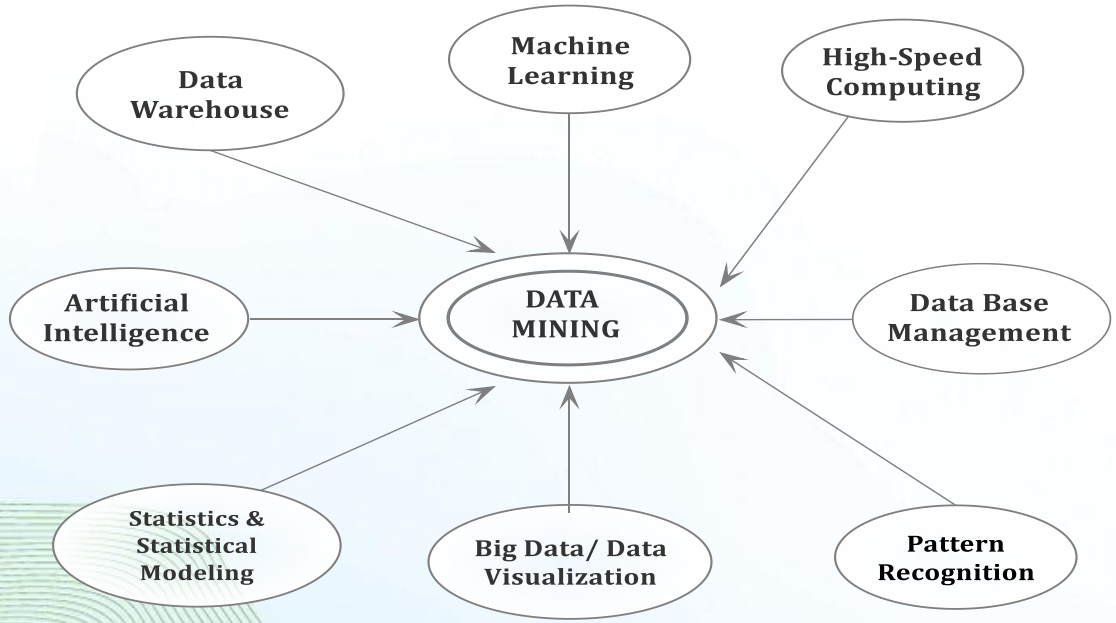


Figure 9.2: The Knowledge Discovery in Data Mining (KDD) Process

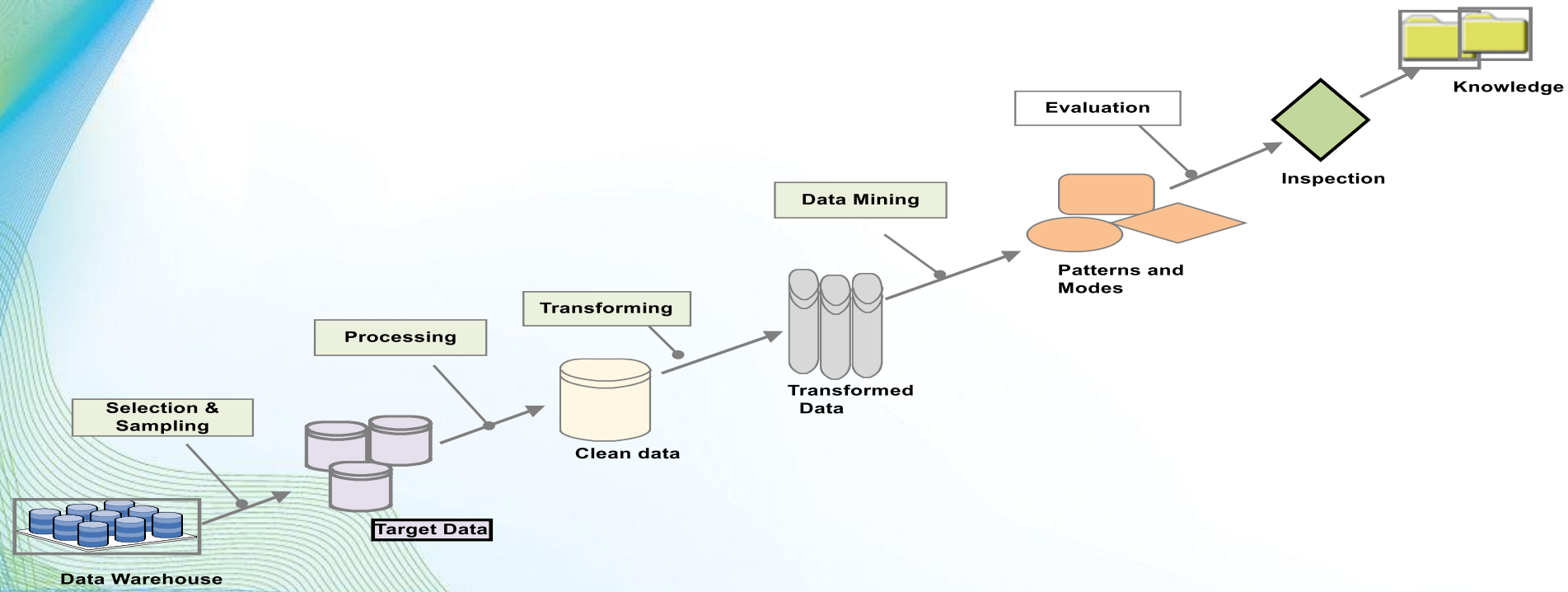


Figure 9.3: Data Mining (KDD) Process: Data Preprocessing and Data Mining Tasks

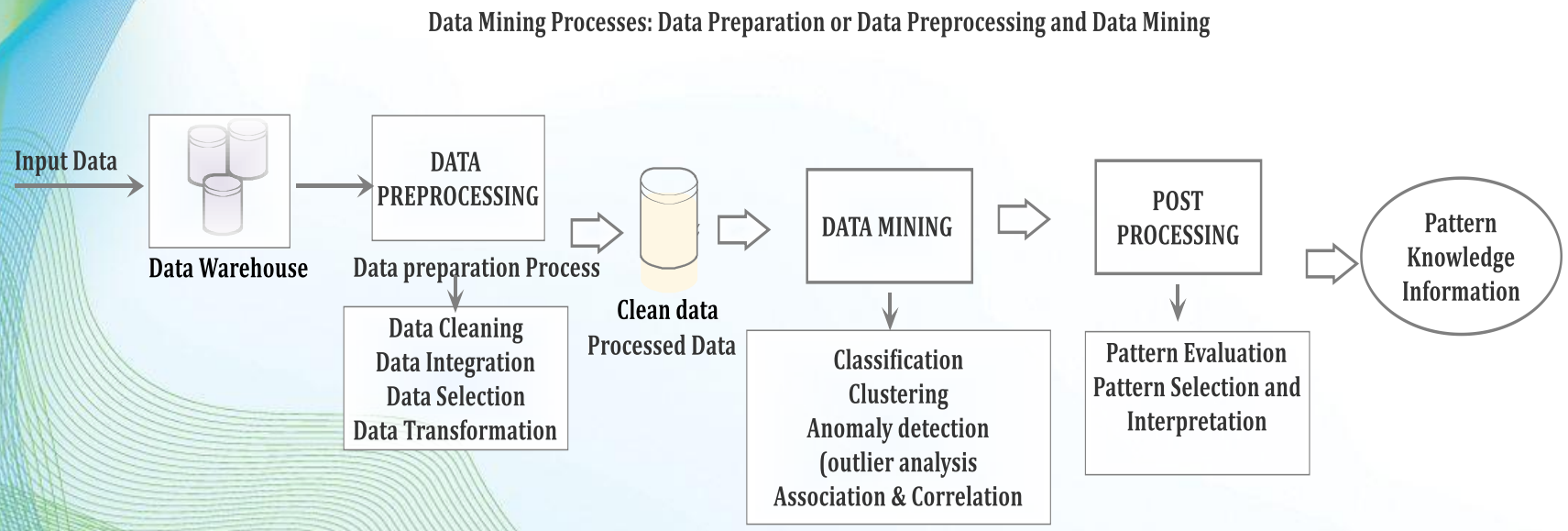


Figure 9.4: Data Mining Tasks

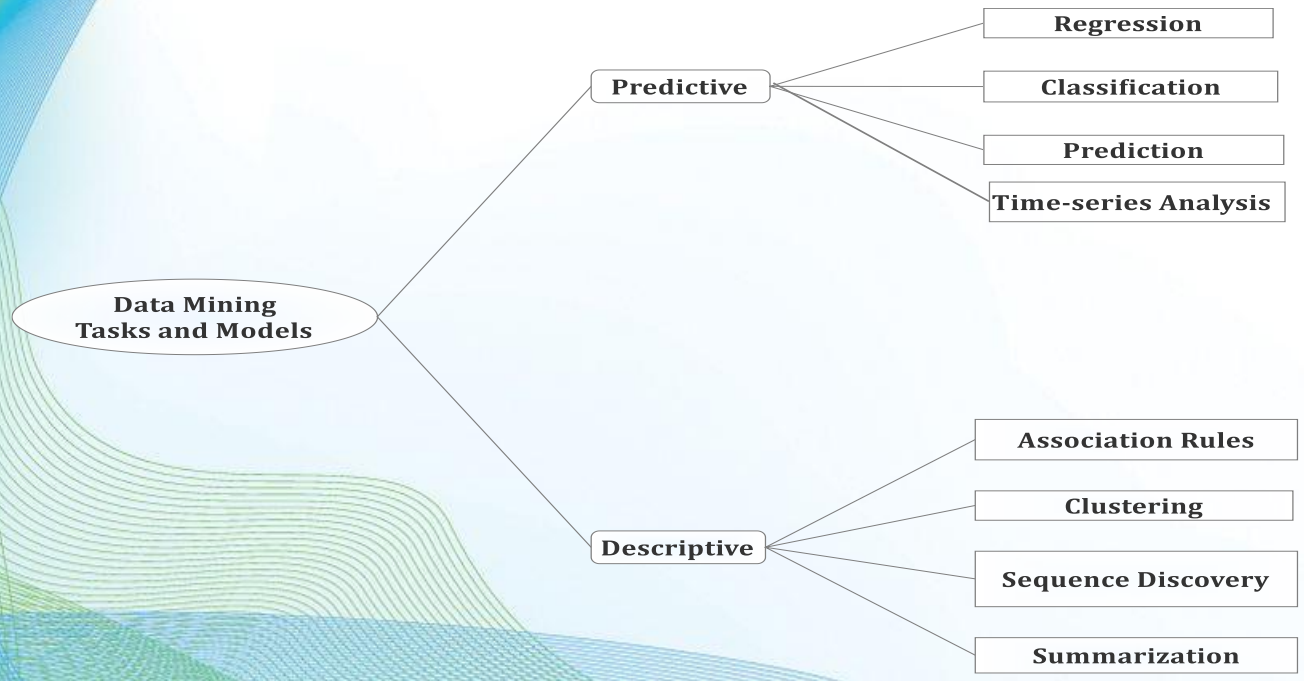


Figure 9.5: Data Mining Methodologies.

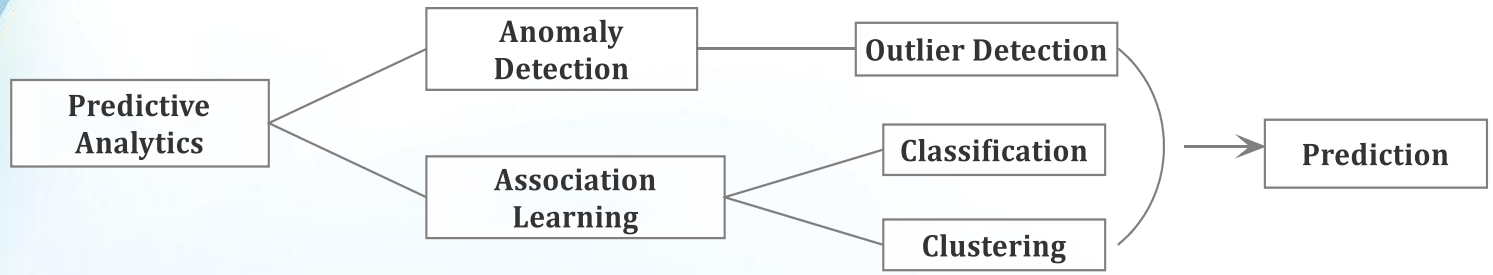


Figure 9.6: Supervised and Unsupervised Learning Techniques

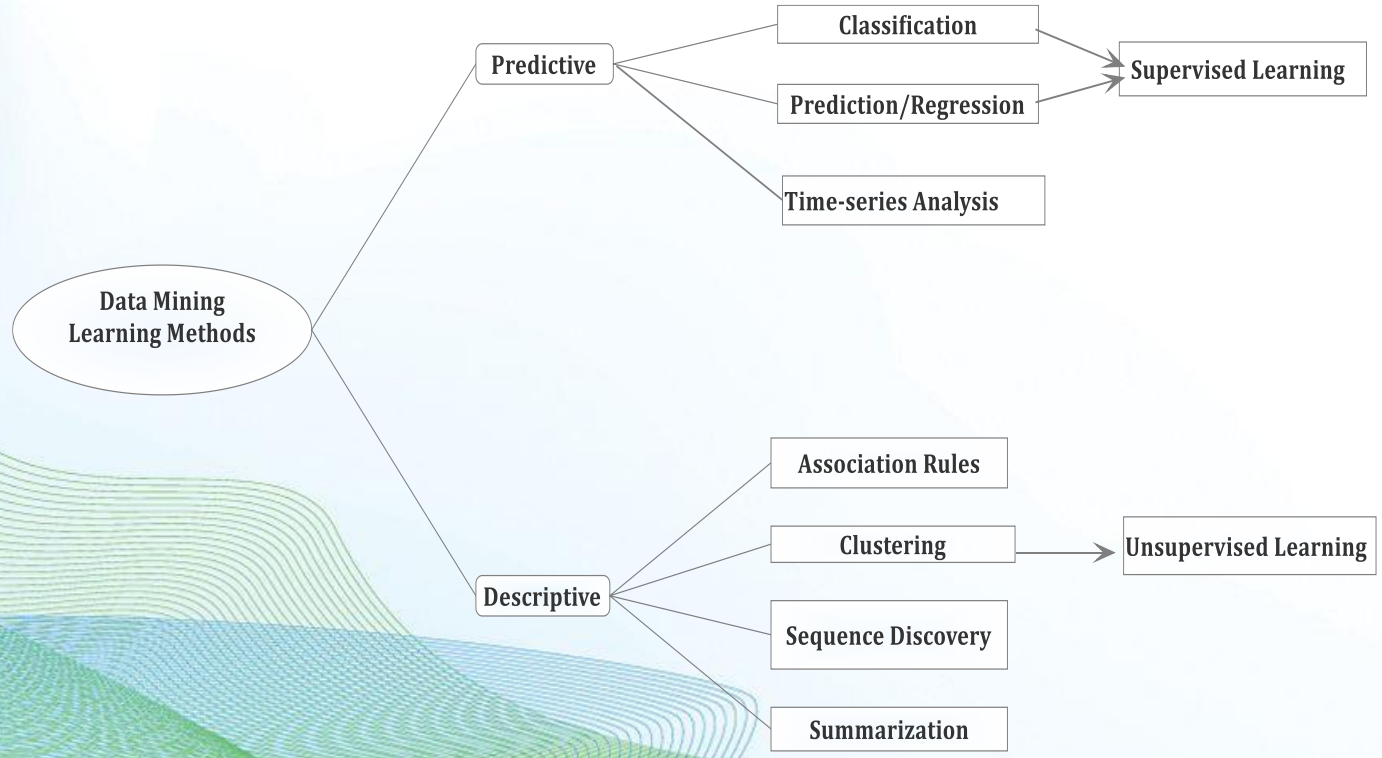


Figure 10.1: Broad area of Analytics

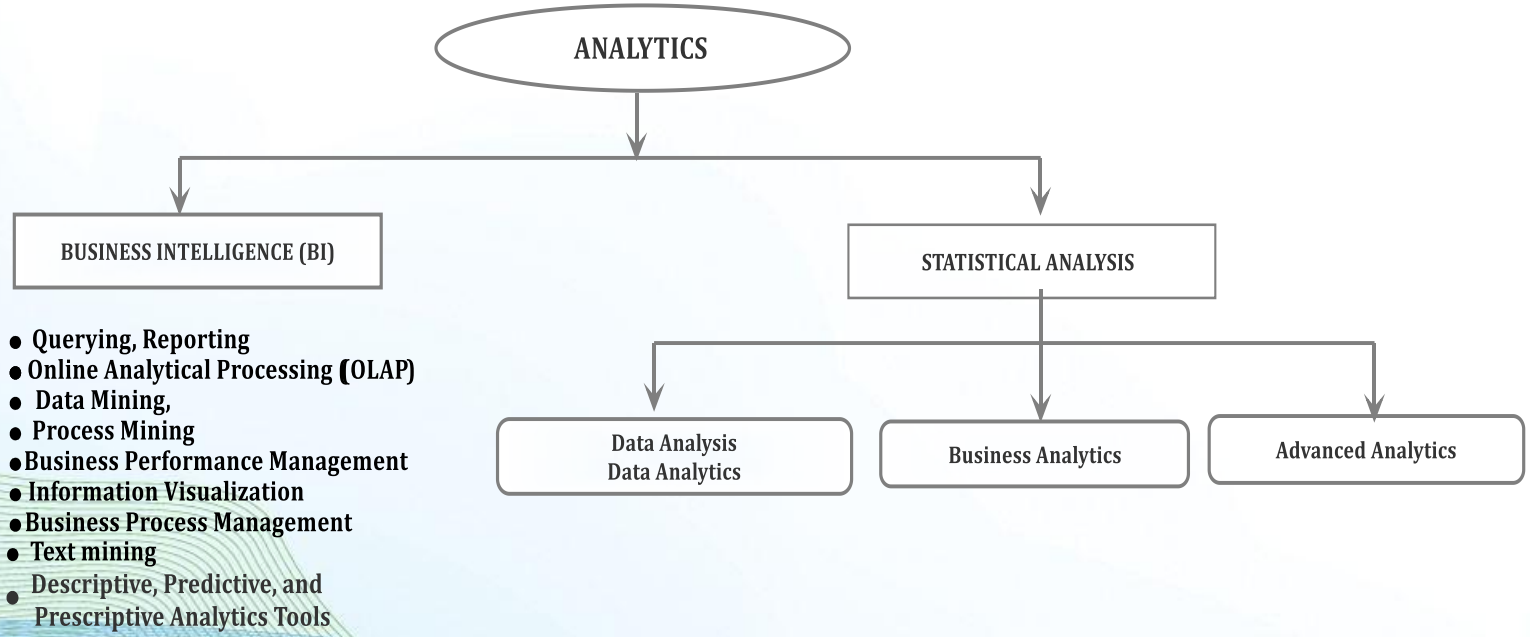


Figure 10.2 Functions of Business Intelligence (BI) and Analytics in Different Areas

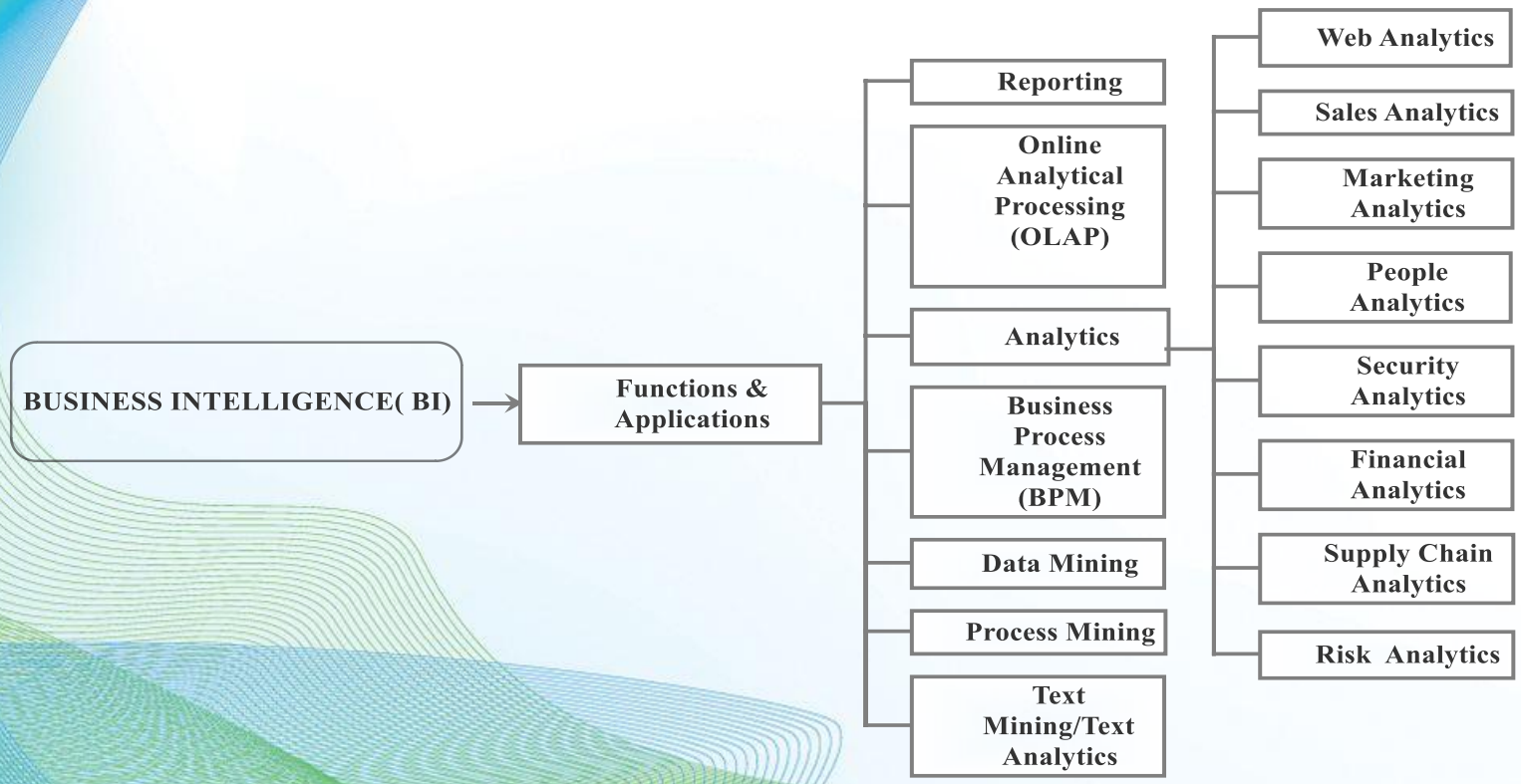


Figure 10.3: Descriptive, Predictive, and Prescriptive Analytics Models

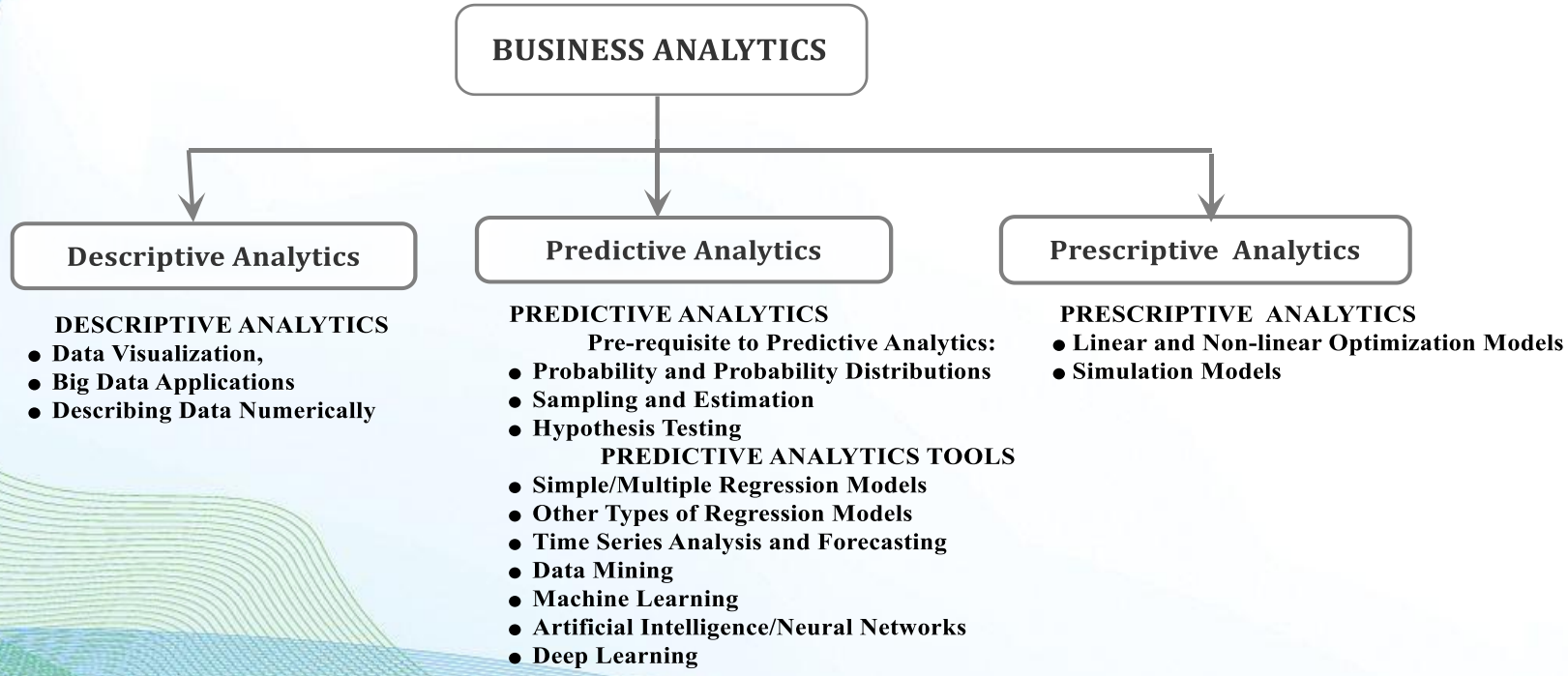
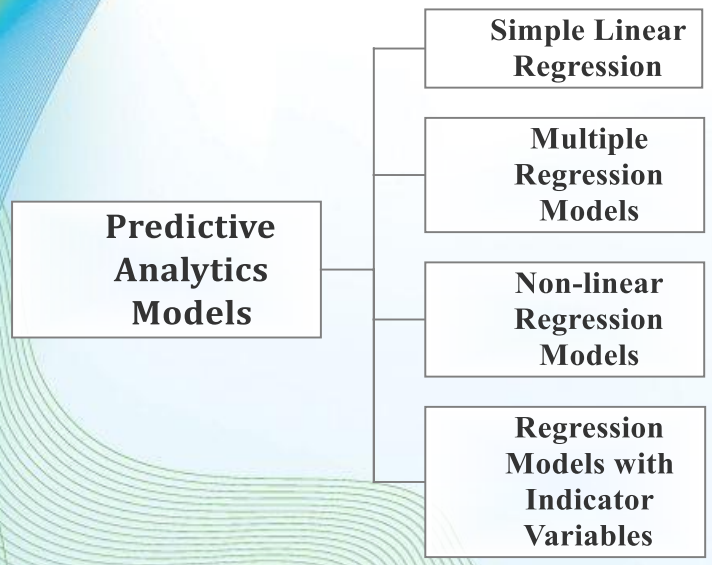


Figure 10.4 (a): Predictive Analytics Models

Figure 10.4 (b): Predictive Analytics Models…Cont..



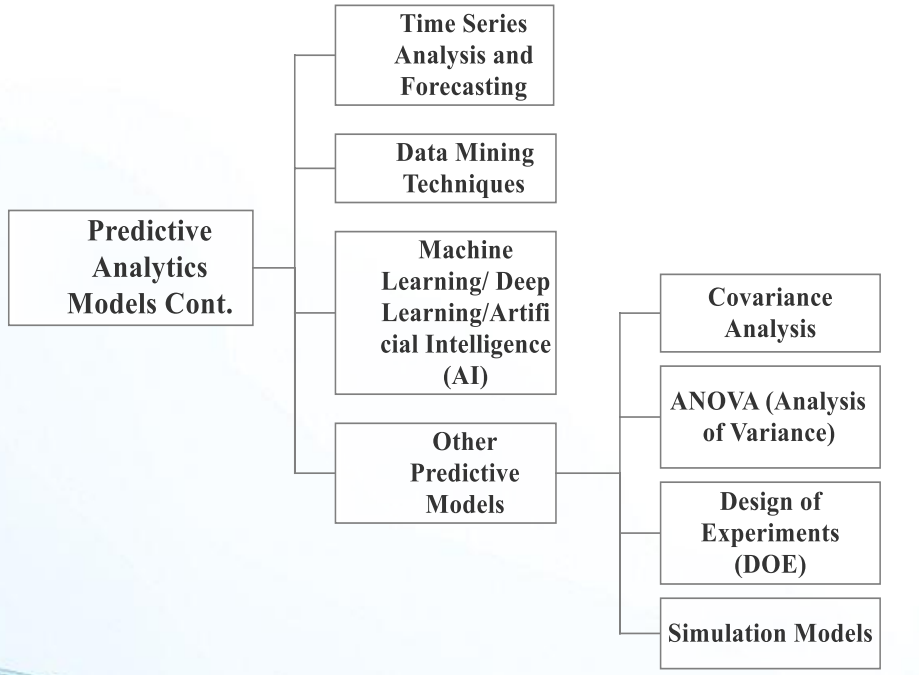


Figure 10.4 (a): Predictive Analytics Models

Figure 10.4 (b): Predictive Analytics Models…Cont..

Figure 10.5: Background and Pre-requisites to Predictive Analytics

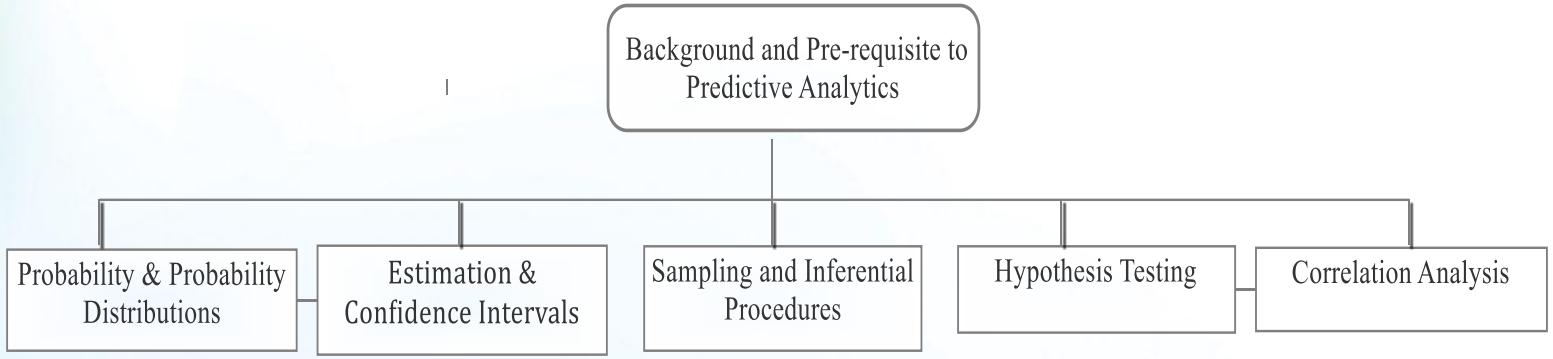


Figure 10.6: Prescriptive Analytics Models