CONCEPT

# Quantitative Methods and Business Statistics for Managers: Inference, Forecasting and Decisions

6 – 17 September 2027
London - Central London four-star



# Quantitative Methods and Business Statistics for Managers: Inference, Forecasting and Decisions

**Ref:** 891_21046 **Date:** 6 – 17 September 2027 **Location:** London - Central London four-star **Fees:** 45540 SAR

## Introduction:

Quantitative methods and business statistics are where many management decisions go wrong: averages hide spread, small samples are treated as proof, forecasts are single guesses and administrative reports present charts that mislead the reader. This Core Concept course equips managers, analysts and report writers to describe data correctly, reason with probability and samples, test claims, model drivers with regression, forecast with time series and choose between options with decision trees and linear programming. Working on case datasets from several sectors, participants produce a Statistically Supported Management Report with a forecast and a decision recommendation.

## Course Objectives:

- Define management questions as measurable variables, choose suitable data sources and judge the quality of the figures collected
- Summarise and present business data with location and dispersion measures, probability distributions and charts that fit the message
- Estimate population values from samples with confidence intervals and test management claims with t, chi-square and ANOVA procedures
- Quantify drivers with correlation and regression and project future values with index numbers and time series methods
- Select between options with payoff tables, decision trees, expected value and linear programming for resource allocation
- Set KPI targets and control limits and write administrative reports that state findings, uncertainty and limitations without misleading

## Target Audience:

- Managers who approve budgets, targets and resource allocations on the basis of figures
- Business and performance analysts who prepare evidence for management decisions
- Administrative and executive office staff who write periodic statistical reports
- Planning and strategy staff who build projections and compare options
- Quality and operations supervisors who monitor process and service indicators
- Department heads who review KPI results and explain variances to senior leadership

## Course Outline:

### Day 1: Numbers in Management Decisions: Data Types and Collection

- Evidence-Based Management Decision Cycle: Question, Measure, Analyse, Act
- Measurement Scales: Nominal, Ordinal, Interval and Ratio Variables
- Primary and Secondary Business Data Sources: Records, Surveys and Transactions
- Operational Definition Sheet for Business Metrics
- Data Quality Checklist: Coverage, Timeliness and Consistency

### Day 2: Descriptive Statistics and Graphical Presentation

- Frequency Distributions and Class Interval Construction
- Location Measures: Mean, Median, Mode and Weighted Mean
- Dispersion Measures: Range, Variance, Standard Deviation and Coefficient of Variation
- Five-Number Summary, Box Plot and Skewness Reading
- Chart Selection Guide: Bar, Line, Histogram, Scatter and Pareto Charts

### Day 3: Probability and Business Distributions

- Probability Rules: Addition, Multiplication and Conditional Probability
- Contingency Tables and Bayes' Theorem for Business Risk Questions
- Binomial Distribution for Defect, Response and Approval Counts
- Poisson Distribution for Arrivals, Complaints and Incident Rates
- Normal Distribution, Z-Scores and Service Level Probabilities

### Day 4: Sampling, Sampling Error and Confidence Intervals

- Sampling Frames with Simple Random, Stratified, Cluster and Systematic Designs
- Sampling Error Versus Non-Sampling Bias in Management Data
- Central Limit Theorem and the Standard Error of the Mean
- Confidence Intervals for Means and Proportions Using z and t Values
- Sample Size Determination for a Target Margin of Error

### Day 5: Week-One Case: Hypothesis Tests and P-Value Interpretation

- Null and Alternative Hypotheses, Type I and Type II Errors and P-Value Reading
- One-Sample and Two-Sample t-Tests for Performance Comparisons
- Chi-Square Test for Customer Segment and Category Associations
- One-Way ANOVA for Branch, Team or Supplier Comparisons
- Guided Case: Service Performance Dataset from Description to Tested Conclusion

## Day 6: Correlation and Regression for Management Questions

- Scatter Diagrams, Pearson Correlation and the Correlation-Causation Trap
- Simple Linear Regression: Least Squares Line, Slope and Intercept Meaning
- Coefficient of Determination and Standard Error of Estimate
- Multiple Regression with Dummy Variables for Price, Promotion and Channel Effects
- Residual Review and Multicollinearity Warning Signs for Non-Specialists

## Day 7: Index Numbers, Time Series and Forecasting Basics

- Simple and Aggregate Index Numbers: Laspeyres and Paasche Price Indices
- Deflating Revenue and Cost Series with a Price Index
- Time Series Components: Trend, Seasonal, Cyclical and Irregular
- Moving Average, Linear Trend Projection and Seasonal Index Forecasts
- Forecast Error Tracking with Mean Absolute Deviation and Tracking Signal

## Day 8: Decision Analysis and Linear Programming for Resource Allocation

- Payoff Tables and Decision Criteria: Maximax, Maximin, Minimax Regret and Hurwicz
- Expected Monetary Value and Expected Value of Perfect Information
- Decision Trees with Sequential Choices and Chance Nodes
- Linear Programming Formulation: Decision Variables, Objective and Constraints
- Graphical LP Solution, Shadow Prices and Sensitivity Ranges

## Day 9: KPI Statistics, Control Limits and Statistical Reporting

- Baseline, Target and Stretch Setting from Historical KPI Distributions
- Shewhart Control Charts: X-bar, p-Chart and Individuals Chart Limits
- Common-Cause Versus Special-Cause Variation Rules for KPI Reviews
- Administrative Report Structure: Executive Summary, Method Note, Findings and Limitations
- Misleading Statistics Checklist: Truncated Axes, Cherry-Picked Periods and Base-Rate Neglect

## Day 10: Capstone: Statistically Supported Management Report

- Case Dataset Briefs from Retail, Healthcare Services and Logistics Operations
- Descriptive Profile and Inference Section Drafting for the Case Dataset
- Regression-Based Driver Analysis and Trend Forecast for the Next Planning Period
- Decision Tree or Linear Programming Recommendation with Sensitivity Range
- Management Report Presentation and Peer Statistical Scrutiny Panel

## Skills You Will Gain:

- Business Data Description
- Probability Reasoning
- Statistical Estimation
- Significance Testing
- Regression Interpretation
- Time Series Forecasting
- Quantitative Decision Analysis
- Statistical Report Writing

## Why Attend This Course:

- Leave with a Statistically Supported Management Report, including a forecast and a decision recommendation, reviewed by a peer scrutiny panel
- Challenge figures presented to you by asking about sample size, spread, uncertainty and the basis of a forecast
- Allocate budgets, staff and capacity with a documented decision tree or optimisation model rather than intuition alone
- Compare reporting practice with managers and analysts from retail, services, logistics and public administration

## Conclusion:

Sound management decisions need numbers that are described honestly, tested properly and linked to a clear choice. The first week builds capability in data types, descriptive statistics, probability, sampling, confidence intervals and hypothesis tests, closing with a guided case. The second week adds regression, index numbers, time series forecasting, decision analysis, linear programming, KPI control limits and statistical reporting. The final day brings these methods together in a Statistically Supported Management Report with a forecast and a decision recommendation for a case dataset.