IBS
CDC

Course Case Mapping for
Quantitative Methods

STATISTICS FOR MANAGEMENT
Seventh Edition
RICHARD I. LEVIN • DAVID S. RUBIN
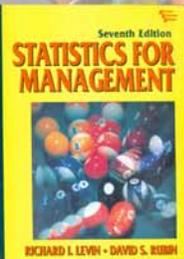
Mapped for
Statistics for Management, Richard I. Levin, David S. Rubin

Case Studies Developed by IBSCDC

Objectives of the Course

- To provide a formal quantitative approach to problem solving

- To give an intuition for managerial situations where a quantitative approach is appropriate

- To introduce some widely used quantitative models

- To introduce software for solving such models.

www.ibscdc.org

2

IBS
CDC

Must-Read Article Inventory

- "Decision trees", Robin Greenwood (*HBR*, March 2006)

- "Note on Linear Programming", Jonathan Eckstein (*HBR*, November 1992)

- "Sampling and Statistical Inference", Arthur Schleifer (*HBR*, August 1996)

- "Decision Analysis", (*HBR*, December 1997)

www.ibscdc.org

IBS
CDC

Widely used Books for Quantitative Methods

- Dance with Chance

- Black Swan

www.ibscdc.org

IBS
CDC

QUANTITATIVE METHODS CASE MAPPING

Chapter	Detailed Syllabus	Session	Key Concepts	Case Study	Abstract	Background Reading/ Additional Reading
Basic Concepts of Scales & Measurements	Nominal, ordinal, interval and ratio scales. Review of central tendencies and dispersion	1	Scales	College Canteen's Decreasing Beverages' Sales: Analysis Dilemmas	Meant for 'Scales of Measurement', this case study presents Raghu's analysis dilemma, the owner-manager of Matrix canteen, which sells various fast food items and beverages. Over the last few months however, he witnessed a steady drop in beverages' sales. Based on his experience, he took all the measures, however, sales did not improve. Ramesh, Raghu's friend, advised him to do an analysis of the buying habits and spending patterns of the customers. Raghu is confused about how should he go about getting the required data that would help him in finding answers to his dilemma and relation between: (a) age and gender (b) Impressions on the service offered by canteen employees (c) Preference for beverages and (d) Amount spent on drinks. This case study is used: (1) To understand the concept and practical applications of scales of measurement; (2) To discuss the implications of scales in Quantitative Methods/Statistics for Management.	•
		2	Central Tendencies and Dispersion	Mattel's Global Expansion: Analysing Growth Trends	This case study is useful for understanding 'measures of central tendencies & dispersion in decision making'. Mattel is the world's largest toy manufacturer. Its best known brands in the industry include *Barbie*, *Matchbox*, *Fisher-Price* and *Hot Wheels*. Through its focused localised international strategy, in recent years the company has increased its revenues from its international operations. If Mattel wants to sustain its success, what should it do? Which brand should it focus more on? Which brand of Mattel has more variation in its sales over the years? Which brand shows good average sales over the years? Based on the past growth trends, how will Mattel's sales be in the next year? Students are asked to analyse the data using central tendencies and dispersion. Thus it is used to discuss the implications of measures of central tendencies and dispersion.	• Chapter 3, "Measures of Central Tendency and Dispersion in Frequency Distributions", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
Probability & Probability Distribution	Basic Concepts of Probability: Addition theorem, Multiplication theorem, Bayes' theorem, Random Variables, Expected Value, Binomial, Poisson and Normal Distributions	3	Basics of Probability & Binomial Distribution	Dilemma of a Sales Executive	The case details a decision problem of a sales executive, Jaffer. He is an excellent employee in meeting his targets. He was given a chance to boost his professional career by giving a presentation to his fellow executives in Bangalore. As Jaffer would not like to miss the target, he would go to Bangalore, only if he is confident of completing the target. Therefore, Jaffer needs to compute the probability that no more than one day is lost in the remaining 29 days due to any of the reasons, and if this probability is sufficiently large, he may decide to accept the invitation. This case study introduces the method of structuring a problem in terms of identifying the decision problem(s), the alternatives, the uncertainties and choosing an alternative with the help of a well defined criterion. After introducing the	• Chapters 4 and 5, "Probabality I : Introductory Ideas" and "Probability Distributions", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition

www.ibscdc.org

IBS CDC

				basic concepts of Probability Theory, it is useful to demonstrate the use of Binomial distribution in resolving complex problems under uncertainty.	
		4		Students' Educational Loans: Bank Manager's Dilemmas on Repayment Probabilities	This case study helps understand the concept of probability and its practical applications in business situations. Every year, banks extend educational loans to various professional courses and the students repay the loans after being employed. However, year 2009 is not 'as usual' for Pinto. Sensitizing him to the economic crisis and the accompanying liquidity crisis, his immediate boss, the regional manager, cautioned him on the repayment probabilities of the students. What if this situation persists for a long time and the students do not get meaningful employment? He came up with various scenarios and he is confused about what is the probability of each of the events occurring? Thus the case study explains different ways of calculating probabilities.	• Chapter 4, "Probability I: Introductory Ideas", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
		5	Bayes' Theorem	Priya's Probability of Getting into a B-School	This case study is written for understanding the conditional probability concept covering primarily the *Bayes Theorem*. This case study, written from generalised experiences, revolves around a student seeking admission into one of the top-tier, ranked business schools in the country. Fortunately for Priya (the student seeking MBA admission) the business school rankings are available for the last few years including the current year. Unfortunately, the business school rankings were done by different agencies and therefore different business schools were ranked differently by different agencies. Priya tries to analyse these rankings to get admission in any one of them. Students can be asked to evaluate the chances of Priya getting admission into one of the business schools, using the concept of probability and Bayes Theorem. Thus this case study is used to understand the concept of Conditional probability and Bayes' Theorem & its scope of business applications.	• Chapter 4, "Probability I: Introductory Ideas", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
Sampling & Sampling Distribution	Population and Samples, Parameters and Statistics, Types of Sampling: Simple Random, Stratified, Systematic and Cluster Sampling, Sampling Distributions, Standard Errors, Sampling from	6	Types of Sampling	Customer Satisfaction with DTH Services in India	This case study is meant for students pursuing course in Quantitative Methods. The case study gives information on the evolution of DTH services in India. It details the surveys conducted by the operators in various situations. The case primarily focuses on how these surveys were conducted using different types of sampling. This case is useful in understanding the concept of Sampling in detail and the application of various types of sampling.	• Chapter 6, "Sampling and Sampling Distributions", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
		7	Population and Samples, Parameters and Statistics	Ascertaining Customer Satisfaction	This case study explores different types of sampling methods. Sakuma India, an FMCG player, wants to assess its customers' satisfaction through a survey after launching a new product line. The marketing members of Sakuma discuss and suggest ways to conduct the survey. Each way has its own merits and demerits. The final question is – which method should Sakuma adopt?	• Chapter 6, "Sampling and Sampling Distributions", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition

IBS CDC

	Normal and Non-normal Populations, Central Limit Theorem, Finite Population Multiplier				Thus the case study helps to analyse the issues to be considered in the process of selecting the sampling. It also gives scope to discuss the merits and demerits of various sampling methods.	
		8	Sampling Distributions, Standard Errors	Swarnamukhi Public Bank Limited's SME Loans	Swarnamukhi Public Bank Limited, one of the rural banks in India, gives loans to Medium and Small Enterprises (MSEs). The bank is worried as the default rate may go up (among the MSEs) because of the recent economic recession. Based on the past data and assumption, the regional manager of the bank tries to estimate the chances of certain proportion of loan takers, who will not make payments. The case study is used to understand Binomial Probabilities and its Normal approximation. It also gives scope to explain different ways of calculating probabilities using Sampling Distribution.	• Chapter 6, "Sampling and Sampling Distributions", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
Estimation & Testing of Hypotheses	Basic Concepts, Type I and Type II Errors, One Tailed and Two Tailed Tests, One Sample Tests, Hypothesis Testing of Means when Population Standard Derivation is Known and when Unknown, Hypothesis Testing of Proportions for Large Samples. Two Sample Tests for Equality of Means for Large and Small Samples, Equality of Means for Dependant Samples, Difference between Proportions for Large Samples	9	Hypothesis Testing – One Sample Test	Smoking: A Costly Affair Now?	This case study examines the trend in people's smoking habit. Because of anti-smoking activists and increasing health-consciousness, many countries increased their tax on cigarettes and few imposed ban on smoking. Some argue that these regulations reduce the number of smokers. However, few oppose this argument. The case ends with a question – observed decrease in proportion of smokers is significant or not. The case study is used: (1)To discuss the testing of hypothesis; (2) To understand the ways to select the right test to examine the hypothesis; (3) To understand the concepts of Sample size and level of Significance and (4) To test the hypothesis and to draw inference.	• Chapter 8, "Testing Hypotheses: One Sample Tests", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
		10		Conversys Inc.	The case details the performance evaluation methods of a call centre company Conversys Inc. Very soon after its inception in July 2000, Conversys became one of the most reputed call centres in Hyderabad, India. The case ends with the dilemma of one of its unit managers, Amit Vardhan, whether one of his subordinate should undergo further training for improving the performance. The case study is used: (1)To understand the concept of type I and type II errors in hypothesis testing; (2) To be able to compute the probability of committing type I and type II errors along with the concept of power of test; (3) To understand the concept of one sample hypothesis testing of means; (4) To understand the concept of paired t-test i.e., hypothesis test of difference of means for dependent samples; and (5) To understand the concept of hypothesis test for difference of means for independent samples.	• Chapter 8, "Testing Hypotheses: One Sample Tests", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
		11		Honda Motor Company	Useful for Testing of Hypothesis. Honda ranked highest in a customer satisfaction survey in 2009 for its after sales service and for being one-stop shop for all accessories (dealership store). However, in the used-car consumers' customer satisfaction survey, it ranked only fifth. Meanwhile, after the launch of its new car Jazz, Honda claims that more than 80% of its	• Chapters 8 and 9, "Testing Hypotheses: One Sample Tests" and "Testing Hypotheses: Two-Sample Tests", *Statistics for*

IBS CDC

				customers are highly satisfied. But few analysts did not agree with that. The case ends with a doubt on this estimation. The case study helps students understand the concepts of sample size and level of Significance.	*Management*, Richard I. Levin and David S. Rubin, 7th Edition
		12		The Strategic Break: To Be or Not to Be	With lot of controversies and issues, Indian premier League's T20 world cup event was held in South Africa recently. In that, the head Lalit Modi introduced an innovative 'Strategic Break' in between the innings. Again it attracted many controversies. Moreover, players also argued that it hampers the momentum of the match. However, Lalit gave reply that it is not an innovative break. It is adopted from other games like Basketball events. The case ends with a question – Can Modi reach to a conclusion whether the players' claim that the strategic break hampers the momentum of the game is correct or not? The case study gives scope for discussing the testing of hypothesis and drawing of inferences.	• Chapters 8 and 9, "Testing Hypotheses: One Sample Tests" and "Testing Hypotheses: Two-Sample Tests", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
Chi-square	Chi Square Test of Independence, Proportions and Goodness of fit	13	Chi Square Test of Independence, Proportions and Goodness of Fit	"Melting Delicacies" Ice Cream Parlour Chain	The case study revolves around an young entrepreneur, Maria Fernandez, who had taken a franchise for a retail ice-cream chain "Melting delicacies". The popularity of this chain of outlets had grown tremendously over the past one year because of its varieties of flavoured ice-creams at reasonable price. However, there was an increase of competition as many new chains entered the market. At this point, Maria felt that knowing answers to certain ground realities on trends, patterns, associations of the product and the consumers was essential for right decisions on inventory planning, etc. The case study is used to understand Chi square test of goodness of fit. It also gives scope to discuss Chi Square test of independence of attributes (Chi square test for association) with notional understanding of why correlation cannot be used in these situations	• Chapter 11, "Chi-Square and Analysis of Variance", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Editon
		14		A Study of Soap Segment in Indian FMCG Market	The case study is meant for Chi Square Analysis. The case study through a research study analyses the overall effect of various sales promotion techniques on consumer buying behaviour. It examined the perception of customers on sales promotion and also the differential effect of the two types of sales promotions namely, cash discount and free gift on the perceptions of the customers. The research revealed that all the sales promotional measures aim at building product awareness, creating interest in the product, stimulating demand by convincing the customers and reinforcing the brand to get loyal customers. The case study ends with the conclusion that the consumers prefer mainly cash discounts rather than any other type of promotional techniques like buy-one-get-one-free, contests and lucky draws as well as the surprise gifts and gift hampers.	• Chapter 11, "Chi-Square and Analysis of Variance", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Editon

IBS
CDC

ANOVA	Analysis of Variance (One Way ANOVA): Test for Equality of Means. Inference about a population variance and about two population variances	15	ANOVA	Global Centre for Case Studies (GCCS)	This case study is meant for discussing, ANOVA technique, which is used to identify the differences among the means of sample from the same population. This case study presents an interesting issue in this regard. Established in 2000, the Global Centre for Case Studies (GCCS) strived towards delivering high-quality case studies in the field of business management. Under the leadership of its director, John Fredrick, GCCS has emerged as a result-oriented organisation. In 2008, with the aim of making the organisation a one-stop destination for all management related case studies, the top management at GCCS decided to add five new teams. Further, to avoid performance related issues, the top management hired new team leaders and team members with relevant domain knowledge and experience. Contrary to expectations, these new teams were constantly struggling with problems. There was an argument that because of the variation in the training methods, the performance has varied. John was wondering whether there will be a difference between the training methods. This case study is meant to discuss the applications of ANOVA.	• Chapter 11, "Chi-Square and Analysis of Variance", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
Bi-variate Analysis, Simple Regression and Multiple Regression	Bivariate analysis-bivariate correlation and regression, Coefficient of determination, assumptions in the regression model, tests of significance for correlation and regression coefficients. Multiple Regression: Regression with two or more explanatory variables, including dummy exploratory variables	16	Regression Analysis	Boosting Sales of Double Bull?	The case study mainly deals with the problem Double Bull, a cola-maker, was facing because of its slow rate of growth in its sales in South India. The case concentrates on the use of regression analysis in drawing conclusions from the sales data available. The case study is used to understand the concept of Bivariate Analysis. It is also used to analyse: • What variables are correlated with sales? • Which variable describes the variability in sales the most? • Which variables significantly describe the variability in sales? • What can the CEO do to improve the situation?	• Chapters 12 & 13, "Simple Regression and Correlation" and "Multiple Regression and Modeling", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
		17		Planning for Road Safety	The case study discusses the matter of increasing number of fatal accidents in the Ivory city in the last few years. It mainly concentrates on the variables, which significantly describe the variability in the number of accidents. The case study's main objective is to help students understand Bivariate Regression with a dummy variable.	• Chapters 12 & 13, "Simple Regression and Correlation" and "Multiple Regression and Modeling", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition

Contd...

IBS CDC

Time Series Analysis	Components of Time Series, Trend Analysis – Moving Average, Fitting linear and second degree trends, Seasonal Variation (Computing using Ratio to Trend Method), Cyclical Variation, Irregular Variation, Problems Involving All Four Components of Time Series	18	Time Series Analysis	The Electric Fan Industry	This case study is meant for Time Series Analysis. Using the monthly production data (from April 2000 to March 2008) for Electrical Fan Industry in India, the case brings out the approach to study trend, seasonality and cyclicality, and their application in short-term forecasting. This case study is used to understand and analyse Trend, Seasonality, Cyclicality and Irregular Components of a Time Series. It is also used to compute Short-term Forecasting based on a study of these components.	• Chapter 15, "Time Series and Forecasting", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
Decision Analysis	Decision Tree Analysis-Expected value under risk, under perfect information, and under sample information	19	Decision Tree Analysis	Kumar Construction Company – Bidding Decision Analysis	The case revolves around Kumar Construction Company, a construction company based in India. It is deliberating on whether it should bid for one or both the contracts, which are on offer from a government department of Andhra Pradesh for the construction of roads in Bowenpally area in Hyderabad. However, the company is worried about the profit it has to make if it bids for any of these contracts. The case explores on the use of Decision Tree Analysis in deciding whether it should bid for a single contract or both the contracts. It is also used to explain different ways of calculating EMVs for different contracts.	• Chapter 17, "Decision Theory", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
		20		Mining for Precious Metals	The case study helps to understand the concept of Decision Tree Analysis. National Mineral Corporation (NMC), a leading metal exploration company, which finds out sites where potential sources of metals are present. Before starting actual explorations, the company buys a small area of land for their trials. An officer at National Mineral Corporation (NMC) has to decide whether he should opt for a 3-day test exploration or not. The case study is used to discuss how Decision Tree Analysis can be used in practical implications.	• Chapter 17, "Decision Theory", *Statistics for Management*, Richard I. Levin and David S. Rubin, 7th Edition
Linear Programming	Formulating Linear Programming Problems, Graphical approach, Sensitivity	21	Linear Programming Problem	Akshara Toys Limited	This case allows exposition to Linear Programming (LP) as well as addresses capital budgeting issues. It details an entrepreneur – Deepika Jain's (Deepika) operations issue of optimal utilisation of resources in her company, Akshara Toys Limited (Akshara). This case helps students to understand the LP model and its business applications as well as how to use LP model for decision dilemmas.	• Chapter 7, "Introduction to Linear Programming", *Quantitative Methods for Business,* David R. Anderson, et al., 10e

IBS CDC

Analysis, Duality, Interpretation of Shadow Prices/ Imputed Costs. Solutions using Excel solver and other software	22		Athletics Authority of Indraprasthan	Kher & Associates, located in Navi Mumbai, is a hospitality firm specialising in nutrition diets. Arjun Kher (Kher), the CEO of the firm, recently came across the possibility of getting an order to supply food items to athletes in the forthcoming Asian games. The diet he has to provide should be balanced and nutritious. Even the cost has to be reasonable. Arun Kumar (Arun), the nutritionist, was given the responsibility of bagging the order. How should he go ahead? Thus the case study is used to understand the Linear Programming model and its business applications.	• Chapter 7, "Introduction to Linear Programming", *Quantitative Methods for Business,* David R. Anderson, et al., 10e
	23		Zhe Jiang Auto Works Inc.	The case details the issues of a Hong Kong-based automobile firm Zhe Jiang Auto Works Inc. (Zhe Jiang). As the company was affected by various reasons, the CEO Chang-sun wants to go for insurance coverage. Even after deep discussion, the executive of the insurance company, Ka-Man Cheung (Cheung) is still not clear as to how to calculate the worth of each resource in order to calculate the premium amount. This case helps students discuss how to use Linear Programming model for decision dilemmas.	• Chapter 7, "Introduction to Linear Programming", *Quantitative Methods for Business,* David R. Anderson, et al., 10e
	24		Hong Kong – Macau – Taipei Bank Inc.		
	25		Snow 'n' Fun Resort	Snow 'n' Fun Resort is a resort located in Shimla, Himachal Pradesh. The case mainly concentrates on the profit the owner of the resort is going to make depending on the snowfall in the winter season. The owner is in a dilemma because she has to choose amongst three options which are-allowing a hotel to operate the resort during the winter, operating the resort herself without using the snow making equipment and operating the resort by herself by taking the snow making equipment on lease. The case uses Decision Trees Concept in order to help the owner take the decision depending on the profit she is going to make.	
	26		Trends in the Production of Cotton Crops in India	The case mainly deals with predicting the future pattern of cotton that is going to be produced by calculating its seasonal index from the past data available. It chiefly concentrates on farmers' marketing cooperative that wants to estimate the number of bags of cotton that would be produced and the variations in the yield of cotton harvest of other members of the cooperative. The case uses Trend Analysis Concept in order to find the seasonal index for the next year.	

IBS CDC

| | | 27 | | Kamal Automobile Repair Shop: Resource Allocation | This case study mainly deals with the usage of Assignment Model in obtaining an optimal cost. Kamal Automobile Repair Shop, owned by Jagadish Sharma, deals with repairing of different automobiles like cars, bikes, auto rickshaws and vans. The owner of the shop assigned three different projects to three of his mechanics with the projects being repairing a car, a bike and an auto rickshaw. Now, the owner is apprehensive because assigning a wrong project to a wrong person would lead to an increase in the expenditure. Therefore, he uses Assignment Model in order to take the most viable decision so that the total expenditure reduces and even the optimal cost could be achieved. | |

IBS
CDC

For Buying This Course Case Pack, Please Contact (Any of the Following)

Sl. No.	Location/City	Contact Name	Designation	Mobile No.	email ID
1	Bangalore	Mr Sudhanshu Mishra	Sr.Territory Manager	09980565906	ssmishra@iupindia.org
2	Hyderabad	Mr D Nagavender Rao	Area Manager	09885451717	dnr@iupindia.org
3	Indore	Mr Sanjay Gangil	Area Manager	09425322620	sanjaygangil@iupindia.org
4	Kochi	Mr Musthafa K.E.	Dy.Manager	09895226559	mushthafa@iupindia.org
5	Kolkata	Mr Sumit Naha	Territory Manager	09331833254	sumitn@iupindia.org
6	Mumbai	Mr Vikram Singh Sandhu	Area Manager	09867672728	vikram@iupindia.org
7	Noida	Mr Hemant P Sharma	Territory Manager	09810080520	hemantps@iupindia.org

IBSCDC,
www.ibscdc.org
IBS Hyderabad,
Survey No.156/157, Dontanapalli Village, Shankerpalli Mandal
Ranga Reddy District - 501504
Phone: 08417-236672
E-mail: info@ibscdc.org, serv@ibscdc.org

IBS CDC