QUANTITATIVE METHODS
Case Studies to Accompany the Quantitative Methods Online Course

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DATA DESCRIPTION

1. Introducing Data

**Big Data, Analytics and the Path from Insights to Value**

Steve LaValle, Eric Lesser, Rebecca Shockley, Michael S. Hopkins, Nina Kruschwitz

Publication Date: Jan 01, 2011

Discipline: Strategy

Source: MIT Sloan Management Review

Product number: SMR372-PDF-ENG

Length: 14p

To understand the challenges and opportunities associated with the use of business analytics, MIT Sloan Management Review, in collaboration with the IBM Institute for Business Value, conducted a survey of more than 3,000 business executives, managers and analysts from organizations located around the world. The survey was part of the 2010 New Intelligent Enterprise Global Executive Study and Research Project, which attempts to understand better how all organizations are trying to capitalize on information and apply analytics today and in the future. One of the most significant findings is that there is a clear connection between performance and the competitive value of analytics. Survey respondents who agreed that the use of business information and analytics differentiated them were twice as likely to be top performers. Three stages, or capability levels, of analytics adoption emerged from the research: aspirational, experienced and transformed. The article provides a comprehensive description of each, enabling organizations to identify where they fall in the continuum. In addition, the authors include suggestions for the best entry points and techniques for each level, and measures to avoid the most common pitfalls. Based on insights from the survey, case studies and interviews with experts, the authors also describe an emerging five-point methodology for successfully implementing analytics-driven management and rapidly creating value --as leading businesses are already managing to do. These include (1) focus on the biggest and highest data priorities, (2) within each of those priorities,
start by asking questions, not by looking at the available data, (3) embed insights into business processes to make them more understandable and actionable, (4) keep existing capabilities and tools while adding new ones and (5) develop an overarching information agenda that enables decision making and strategy for the future.

2. Describing and Summarizing Data

Deloitte Recommends Client Selection to Regency Bank

Mehmet Begen, Stacey Yue

Publication Date: May 25, 2011

Discipline: Information Technology

Source: Richard Ivey School of Business Foundation

Product number: W11086-PDF-ENG

Length: 4p

This case presents a situation in which a large financial institution has acquired a sizable HBP Questions.docx 19 KB Save to OneDrive — Harvard Business Publishing Cancelling... portfolio of new clients of travel (corporate expense) cards. The bank must decide on the optimal mix of clients to retain in order to achieve their goals of maximizing profitability, entering a new product market successfully and maintaining reputation. The optimal mix depends on a number of different factors, including annual account spend level, complexity of serving the account, the number of cards in each account, account risk and account retention level. The selection and number of clients chosen will affect the bank's future profitability and long term strategy. The bank is limited by attempting to achieve a three-year payback, and facing costs that can vary significantly (and which are not in the bank's control).

Ernst and Young: The Western Bank Audit

Gregory S. Zaric

Revision Date: Sep 17, 2009

Publication Date: Feb 06, 2006

Discipline: Information Technology

Source: Richard Ivey School of Business Foundation
The senior staff accountant was conducting an audit for a bank client. As part of the audit, the senior staff accountant needed to verify the total interest expenses and revenues reported by the bank during the 2004 fiscal year. He had gathered data on total interest revenues and expenses as reported by the bank, as well as, the prime rate as reported by the Bank of Canada. The staff accountant intends to use linear regression to examine the relationships between revenue and interest rates and between expenses and interest rates as a way of identifying outliers that may require more detailed attention as part of the audit.

John Carter: Hedging

Samuel E Bodily, Lee Fiedler

Publication Date: Sep 10, 2002

Discipline: Economics

Source: Darden School of Business

A farmer can lock in the prices of his product and wants to know how much, if any, of the production should be hedged. This case examines how the answer is affected by factors such as the certainty of how much will be produced, the relationship between prices and production, and the risk aversion of the farmer. This case permits an analysis of how hedging policies should change reflecting the different behavior of the variables that affect the results.

West Coast University Student Health Services--Primary Care Clinic

David Wylie, Ashok Rao, Jay Rao, Ivor Morgan

Publication Date: Jan 01, 2000

Discipline: Service Management

Source: Babson College
Integrates issues in service operations, organization behavior, and applications of management science models such as simulation and queuing theory. A complete analysis of the case includes understanding process flows, computing utilization levels, and using models of the stochastic arrival rate and service rates of the existing and proposed systems. In addition, considers the managerial issues involved in running an ambulatory care center. The Primary Care Clinic (PCC) is the only walk-in clinic on campus and presently works under a triage system. The Student Health Services (along with PCC) is scheduled to move to a new facility. The director of the PCC views the move as a good opportunity to review and improve on the present service delivery process and system. Three broad objectives have been identified for the new system: reduce the waiting time for seeing a healthcare provider, transform the perception of the clinic as an impersonal bureaucracy, and improve student perceptions (especially nonusers) about the performance and effectiveness of the PCC. To achieve these objectives, a new system of clinician teams (doctors and nurse practitioners) has been proposed.

Lehigh Steel

V.G. Narayanan, Laura E. Donohue

Revision Date: Apr 07, 1998
Publication Date: Mar 26, 1998
Discipline: Accounting
Source: Harvard Business School

Lehigh Steel is a specialty steel manufacturer that plummeted from record profits to record losses in less than three years, driven by an inability to distinguish between profitable and unprofitable business. The scale and growth of service activities and overhead costs in an increasingly customized product line suggests that activity-based costing (ABC) could unlock the secrets of profitability. However, the high fixed-cost structure suggests that theory of constraints (TOC) could also be relevant. Lehigh must determine how to measure profitability to rationalize its products.

learning objective:
To demonstrate to students that Accounting methods must reflect the economics of the business, the time horizon, and the nature of the decision. To assess the relevance of various costs and the structure (fixed or variable) to calculate profitability relevant to a product mix decision over a certain time horizon.

3. Variability

Alex Sharpe's Portfolio

Colette Southam

Publication Date: Jul 11, 2008

Discipline: Finance

Source: Richard Ivey School of Business Foundation

Product number: 908N20-PDF-ENG

Length: 4p

Alex Sharpe's Portfolio provides an introduction to the Capital Asset Pricing Model (CAPM), portfolio diversification and risk management. Sharpe currently holds the Vanguard 500 Index Fund, but is considering a more active management strategy. Students must assess the risk of the two stocks she is considering adding to her portfolio. Students are provided with monthly stock returns and must calculate the standard deviations of the individual stocks and of the portfolios when one of the stocks is added to it. Students must calculate the stock's beta using regression and will learn that beta is the appropriate measure of risk to use in decision making since risk-averse investors do not hold stocks in isolation.

4. Applying Data Analysis

Atlantic Computer: A Bundle of Pricing Options

Neeraj Bharadwaj, John B. Gordon

Publication Date: May 28, 2007

Discipline: Marketing

Source: Harvard Business Publishing Brief Cases

Product number: 2078-PDF-ENG
Atlantic Computer, a leading player in the high-end server market, has detected a marketplace opportunity in the basic server segment. They have developed a new server, the Tronn, to meet the needs of this segment. In addition, they have created a software tool, called the "Performance Enhancing Server Accelerator," or PESA, that allows the Tronn to perform up to four times faster than its standard speed. The central question revolves around how to price the Tronn and PESA. Although cost-plus, competition-based, and status-quo pricing are the most common means by which firms establish prices for their offerings, these approaches may prevent firms from fully realizing the benefits that are due to them. Provides an opportunity to optimize value capture for the firm by utilizing value-in-use pricing (i.e., examining the value that a firm's offering creates for the customer, and using the savings generated as the basis for developing prices). Also allows for the exploration of the challenges surrounding the implementation of a value-in-use pricing strategy. These include the reactions of competitors, customers, and stakeholders within the firm.

The Springfield Nor'easters: Maximizing Revenues in the Minor Leagues

Frank V. Cespedes, Laura Winig, Christopher H. Lovelock

Revision Date: May 11, 2009

Publication Date: Jul 25, 2008

Discipline: Marketing

Source: Harvard Business Publishing Brief Cases

Product number: 2510-PDF-ENG

Length: 13p

The marketing director of a new minor-league baseball team must design, conduct, and then interpret survey research to determine optimal ticket pricing that will yield large attendance figures and contribute to the owner's goal of breaking even in the first year of play. The pricing assignment becomes more challenging when other variables like concessions revenue are considered. Students are asked to complete a quantitative assignment as part of case analysis, but they must grapple with less quantifiable factors as well.
To develop an enterprise-wide view of analytics, a company must do more than integrate data, combine analysts, or build a corporate IT platform. It must eradicate all of the limited, piecemeal perspectives harbored by managers with their own agendas, needs, and fears - and replace them with a single, holistic view of the company. Without a broad business perspective, a company cannot address the strategic issues at the core of business performance and organizational competitiveness. Analytics can illuminate high-level questions about investment optimization, company strategy alignment, customer satisfaction, market condition influence, and key performance factors, but only if decision makers can see across regions, business units, or processes and consider information from the enterprise perspective. In this chapter, the authors of the groundbreaking Competing on Analytics describe just how much integration and coordination are needed to develop an enterprise analytics capability and how to gauge your company's progress through the five stages of analytical mastery. This chapter was originally published as Chapter 3 of Analytics at Work: Smarter Decisions, Better Results.

5. Relationships between Variables

Markov's Trilemma

Yiorgos Allayannis

The key objectives of this case are to: (1) familiarize students with a simple version of the Markowitz optimal-asset allocation model; (2) develop students' intuition regarding optimal-asset allocation as
specific inputs into the model (e.g., expected returns, standard deviations, correlations) change values; and (3) develop students' intuition regarding constraints that alternative investors may face (e.g., the presence of shorting constraints) and their impact on the optimal portfolio.

State of South Carolina

Randolph B. Cohen, Mark Mitchell

Revision Date: May 25, 2001

Publication Date: Nov 07, 2000

Discipline: Finance

Source: Harvard Business School

Product number: 201061-PDF-ENG

Length: 31p

This case presents the managerial dilemma faced by the treasurer of South Carolina in 1998. Until last year, the South Carolina state pension fund (with over $17 billion in assets) was barred by the state constitution from investing in equities. After the constitution was amended, the state government had to decide how much to invest in equities and what assets to choose. Using domestic and international data, the concepts of standard deviation, correlation, covariance, diversification, and risk are introduced. Additionally, the case looks at the equity premium from a global setting. This case covers two days and will be used early in the Risk and Return module, just before the introduction of the CAPM.

Innocents Abroad: Currencies and International Stock Returns

Mihir A. Desai, Kathleen Luchs, Mark F. Veblen

Revision Date: Nov 15, 2004

Publication Date: Mar 02, 2004

Discipline: Finance

Source: Harvard Business School

Product number: 204141-PDF-ENG

Length: 21p
What do international stocks contribute to the portfolio of a U.S. investor? How do currencies interact with stock price movements in determining the benefits of international diversification? This case helps students compare the risks and returns of foreign stock markets with each other and with the U.S. market and to examine the risks and returns of international diversification. Students must calculate returns, adjust for currencies, derive correlations, and map efficient frontiers based on raw data. To obtain executable spreadsheets (courseware), please contact our customer service department at custserv@hbsp.harvard.edu.

**SAMPLING AND ESTIMATION**

1. **Introduction to Sampling**

*Understanding Political Polls*

Chris A. Higgins

Publication Date: Aug 23, 2007

Discipline: General Management

Source: Richard Ivey School of Business Foundation

Product number: 907E16-PDF-ENG

Length: 2p

This case examines the interpretation of political polls. It discusses margin of error, confidence intervals and the relationship between sample size and margin of error. An Excel spreadsheet is included, Ivey product # 7B07E016, to help students understand the concepts.

2. **Generating Random Samples**

*List Testing Exercise: Economic Selection*

Phillip E. Pfeifer
These cases describe the common direct-mail practice of testing a random sample of names from a rented list in order to decide whether to rent (and roll out) the entire list. Students must decide how many names to test and how many rounds of testing to conduct before making the roll-out decision. The cases are designed to support a class exercise in which teams of students conduct simulated tests and rollouts. In the "economic selection" case, economic parameters are provided such that each team receives a dollar profit for the exercise.

3. Estimating the population mean [and estimations in general]

Pilgrim Bank (A): Customer Profitability

Frances X. Frei, Dennis Campbell

Revision Date: Aug 25, 2005

Publication Date: Oct 19, 2001

Discipline: Service Management

Source: HBS Premier Case Collection

Product number: 602104-PDF-ENG

Length: 8p

Used as part of the third module of a course on Managing Service Operations, which addresses how managers can inform their decisions with customer data (606-097).

Provides a context in which students can explore managerial decision making that is critically informed by data analysis. The setting is a retail bank and the decision making relates to the bank's policy toward online banking. The management team is evaluating whether the bank should charge for access to online banking, provide incentives to use the service, or devise some other policy altogether. With thousands of customers already using the online site, the bank is well positioned to assess the impact of the service on customer profitability and retention before making final policy decisions. Told from the
perspective of a recent MBA graduate who was charged with performing the necessary data analysis and ultimately coming up with policy recommendations.

4. The Normal Distribution

Lorex Pharmaceuticals

Phillip E. Pfeifer

Revision Date: Aug 01, 1993

Publication Date: Apr 05, 1991

Discipline: Operations Management

Source: Darden School of Business

Product number: UV0347-PDF-ENG

Length: 4p

In this case, the managers of quality assurance must specify a fill-target for individual bottles of a new blood-pressure medicine. Higher targets lead to higher material costs but fewer seconds. This case illustrates the use of the normal distribution and the normal tables to provide necessary probabilities. The student will learn to use the normal distribution and normal tables to calculate probabilities; recognize the usefulness of the normal distribution and learn how to check a data set for normality; practice a trial-and-error approach for maximizing expected value; and understand the conditions that make a critical fractile analysis (news vendor problem) inappropriate.

5. Confidence Intervals

Understanding Political Polls

Chris A. Higgins

Publication Date: Aug 23, 2007

Discipline: General Management

Source: Richard Ivey School of Business Foundation

Product number: 907E16-PDF-ENG
This case examines the interpretation of political polls. It discusses margin of error, confidence intervals and the relationship between sample size and margin of error. An Excel spreadsheet is included, Ivey product # 7B07E016, to help students understand the concepts. This is an excellent case for helping students understand the basics of sampling, the relationship between the margin of error and sample size, and confidence intervals. An Excel spreadsheet accompanies the case, Ivey product # 707E16, to allow the instructor to illustrate the concepts taught in the case. The students and instructor will need to have access to the Excel program from Microsoft to use the spreadsheet.

6. Proportions

Intelliseek

Luc Wathieu, Allan Friedman

Revision Date: May 09, 2005

Publication Date: Feb 15, 2005

Discipline: Marketing

Source: Harvard Business School

Product number: 505061-PDF-ENG

Length: 22p

Intelliseek harvests, filters, and mines the content of messages posted by consumers online and on discussion boards and blogs. For any specified consumer product brand, Intelliseek measures the volume of work-of-mouth and its valence (proportion of positive and negative comments) and produces organized sets of quotes in the manner of a focus group report. This "marketing intelligence" company has been successful selling its reports to the car industry, but finds it difficult to achieve client retention in other areas. New initiatives are suggested: (1) to arrange data in problem-specific templates so that it is more "actionable" and (2) to develop industry benchmark metrics against which the metrics can be compared in a more informative manner. The CEO of the company believes that the key to success is a streamlined, standardized approach to the metrics developed for client brands. The CMO believes that Intelliseek should go much further to capitalize on the opportunity to understand customers emerging from what he calls "consumer-generated media."
HYPOTHESIS TESTING

1. Introduction to Hypothesis Testing

Store24 (A): Managing Employee Retention

Frances X. Frei, Dennis Campbell

Revision Date: Aug 22, 2005

Publication Date: Oct 30, 2001

Discipline: Operations Management

Source: HBS Premier Case Collection

Product number: 602096-PDF-ENG

Length: 5p

Used as part of the third module of a course on Managing Service Operations, which addresses how managers can inform their decisions with customer data (606-097). Provides a retailing context in which employee retention strategies are explored through analyzing detailed store-level data.

Exercise: Challenging Operational Assumptions

Frances X. Frei

Publication Date: Mar 31, 2008

Discipline: General Management

Source: Exercises

Product number: 608128-PDF-ENG

Length: 1p

This exercise provides students with an opportunity to thoroughly test an operating assumption. Students state an assumption as a testable hypothesis, collect and analyze relevant data, and communicate the results. At HBS, it is incorporated in a second year elective taught in a module devoted to utilizing customer-operators to improve service operations (HBS 608-135). The exercise is taught in three parts: in-class workshop, project presentation, and post-exercise poll.
Managers regularly implement new ideas without evidence to back them up. They act on hunches and often learn very little along the way. That doesn't have to be the case. With the help of broadly available software and some basic investments in building capabilities, managers don't need a PhD in statistics to base consequential decisions on scientifically sound experiments. Some companies with rich consumer-transaction data - Toronto-Dominion, CKE Restaurants, eBay, and others - are routinely testing innovations well outside the realm of product R&D. As randomized testing becomes standard procedure in certain settings (website analysis, for instance), firms learn to apply it in other areas as well. Entire organizations that adopt a "test and learn" culture stand to realize the greatest benefits. That said, firms need to determine when formal testing makes sense. Generally, it's much more applicable to tactical decisions (such as choosing a new store format) than to strategic ones (such as figuring out whether to acquire a business). Tests are useful only if managers define and measure desired outcomes and formulate logical hypotheses about how proposed interventions will play out. To begin incorporating more scientific management into your business, acquaint managers at all levels with your organization's testing process. A shared understanding of what constitutes a valid test - and how it jibes with other processes - helps executives to set expectations and innovators to deliver on them. The process always begins with creating a testable hypothesis. Then the details of the test are designed, which means identifying sites or units to be tested, selecting control groups, and defining test and control situations. After the test is carried out for a specified period, managers analyze the data to determine results and appropriate actions. Results ideally go into a "learning library," so others can benefit from them.
Strategic performance measures are the foundation of effective strategy management—the key to taking the Balanced Scorecard, or any performance system, from the theoretical to the applied. It is through the process of developing measures that organizations establish, in concrete terms, the drivers of performance. Measures and their results are the real test of strategic hypotheses. But developing appropriate, strategically vital measures and targets that support the strategy is an underappreciated challenge, one whose dimensions leaders at first often don't grasp. It's not simply that "If you don't measure it, you can't manage it"; you've got to measure it right. Most organizations are awash in financial data and deficient in measures of nonfinancial performance. And a large proportion of the measures they do track are not strategically relevant. With too much data and too little useful information, many organizations must start their BSC program without 100% of the right measures in place. This reader helps organizations define the right measures and targets. Organizations must strike a "Goldilocks" balance: not too many measures as to burden themselves or complicate analysis, yet just enough to glean a 360-degree picture. Target setting is an equally, if not more, delicate exercise. Organizations must define baseline, reasonable, and stretch levels of performance and then reconcile them with existing and desired organizational competencies and goals. And the targets they set must motivate high performance without encouraging risky behavior or attempts to game the system.

REGRESSION BASICS

1. Introduction to Regression

Wilkins, A Zurn Company: Demand Forecasting

Carol Prahinski, Eric Olsen

Publication Date: Sep 13, 2006

Discipline: Marketing

Source: Richard Ivey School of Business Foundation

Product number: 906D06-PDF-ENG

Length: 12p
The newly promoted inventory manager wonders if there is an easier, more reliable means of forecasting sales demand. Currently, forecasts are based on the plant manager’s, sales/marketing manager’s, and inventory manager’s knowledge of industry trends, competitive strategies, and sales history. The inventory manager must decide if using statistical forecasting methods would ease the forecasting process and make the forecasts more reliable. Students are exposed to different forecasting techniques, including executive opinion, linear regression, and time series. The data characteristics include seasonality, trend, and random fluctuations.

Supply Chain Optimization at Madurai Aavin Milk Dairy
Unnikrishnan Dinesh Kumar, P. Arun Pandian, Nachiappan SP
Publication Date: Dec 01, 2011
Discipline: Operations Management
Source: Indian Institute of Management-Bangalore
Product number: IMB341-PDF-ENG
Length: 9p

The Madurai District Cooperative Milk Producers' Union Ltd. also known as Madurai Aavin Milk Dairy (MAMD) has been one of the largest dairies in the southern part of Tamil Nadu, India. One of the major activities in the MAMD's supply chain was the procurement of milk from the farmers and also to provide necessary technical input facility to them. The procurement was carried out by forming village-level milk producers' cooperative societies (MPCS). The supply of raw milk from the farmers around Madurai to Aavin is decreasing, whereas the demand is increasing. Several strategies are explored by Aavin to meet the demand for their main product, "premium milk". Aavin faces two challenges: 1. Forecasting the demand for premium milk and 2. Meeting the demand in an optimal manner that would maximize their profit.

IBM Retail Business Assessment at Dillard's, Inc.: Managing Staffing Levels to Improve Conversion
Zeynep Ton
Revision Date: Feb 26, 2010
This case illustrates the challenges associated with matching staffing levels with variable workload in retail stores and highlights how decisions related to staffing and scheduling affect operational performance and the quality of labor at the stores. The case describes the tasks (both in-store logistics and customer service tasks) that are carried out by store employees at one Dillard's department store and presents nine weeks of traffic data at an hourly level collected by IBM. Additional data on labor hours and number of customer transactions allow students to examine the relationship between staffing levels and conversion rate. Given the large variation in customer traffic over time and the relationship between staffing levels and conversion rates, how should Dillard's manage staffing levels?

2. Calculating the Regression Line

A-Rod: Signing the Best Player in Baseball

Randolph B. Cohen, Jason Wallace

Revision Date: Jan 27, 2003
Publication Date: Sep 23, 2002
Discipline: Finance
Source: Harvard Business School
Product number: 203047-PDF-ENG
Length: 14p

This case analyzes a large investment decision considered by the Texas Rangers in 2000: whether to spend $252 million for the services of shortstop Alex Rodriguez. The signing was probably the most controversial sports contract of the past decade.
3. Deeper into Regression

**Colonial Broadcasting Co.**

George Wu

Publication Date: Nov 22, 1993

Discipline: Negotiation

Source: HBS Premier Case Collection

Product number: 894011-PDF-ENG

Length: 9p

Colonial Broadcasting, a major American television network, must determine whether fact-based television movies garner higher Nielsen ratings than movies based on fictional concepts. Furthermore, the network must decide whether to accept a fixed-fee advertising contract or a sliding-scale contract.

**Playa Dorada Tennis Club: Expansion Strategy (Brief Case)**

W. Earl Sasser Jr., Brent Kazan

Publication Date: Jun 28, 2010

Discipline: Service Management

Source: Harvard Business Publishing Brief Cases

Product number: 4221-PDF-ENG

Length: 10p

Playa Dorada Beach & Resort in Boca Raton, Florida, faces a growing seasonal demand for tennis services. The number of guests is expected to double in the next few years, and while the tennis facilities are a popular and well-promoted amenity at the resort, court space is limited. The director of tennis operations analyzes court capacity, usage history, pricing, and other factors as he assembles a plan for expansion. He must also consider how his strategy affects other divisions of the Playa Dorada
Corporation, including finance, operations, marketing, and sales. Can he transform the resort's tennis operations into a profit center? To prepare for case discussion, students complete a quantitative analysis of past and expected future usage of the tennis facilities and formulate a growth strategy.

**The Prediction Lover's Handbook**

Thomas H. Davenport, Jeanne G. Harris

Publication Date: Jan 01, 2009

Discipline: Marketing

Source: MIT Sloan Management Review

Product number: SMR299-PDF-ENG

Length: 5p

When picking assessment tools to inform better decisions about future paths, executives are faced with a wide variety of options--some of which are well established, while others are in early stages of development. The authors provide an insider's guide to prediction and recommendation techniques and technologies. They cover prediction tools including attributized Bayesian analysis, biological responses analysis, cluster analysis, collaborative filtering, content-based filtering/decision trees, neural network analysis, prediction (or opinion) markets, regression analysis, social network-based recommendations and textual analytics. With each potential tool, they briefly describe the technique, who uses it and for what purpose, its strengths and weaknesses, and its future prospects as a prediction tool. Finally, the authors offer up an indication of the best time in the decision process to begin using the tool.

**MULTIPLE REGRESSION**

1. Introduction to Multiple Regression

**Harmon Foods, Inc.**

William B. Whiston

Revision Date: Sep 29, 2006

Publication Date: Dec 01, 1970

Discipline: Economics
Prediction and shipment has been a scheduling and budgetary problem. Multiple regression is suggested as a solution. Evaluation of regression coefficients leads to better understanding of trend, seasonality, and promotion effectiveness.

**Compass Maritime Services, LLC: Valuing Ships**

Benjamin C. Esty, Albert Sheen

Revision Date: Dec 06, 2010

Publication Date: Sep 13, 2010

Discipline: Finance

Source: Harvard Business School

Product number: 211014-PDF-ENG

Length: 7p

Tom Roberts, a founding partner of Compass Maritime Services, a New Jersey-based shipping research and consulting firm, has been asked by a new potential customer in May 2008 for advice on purchasing a capesize bulk carrier. After identifying a suitable ship with his colleague Basil Karatzas, they must determine an appropriate offer price for the ship and justify their recommendations.

**3. New Concepts in Multiple Regression**

*Crawford Development Co. and Southeast Bank of Texas*

Anton Ovchinnikov

Revision Date: Aug 31, 2010

Publication Date: Dec 31, 2008

Discipline: Finance

Source: University of Virginia Darden School Foundation
In the early months of the 2007-08 financial crisis, a loan manager faces a real estate financing decision. Should he approve a bullet structure three-year loan to a longstanding client, a legendary Texan developer? The developer, who near retirement downsized his business, is seeking financing for his only project: residential or commercial development on an attractive piece of land in suburban Houston. The loan manager considers the decision in light of the mortgage market turmoil, seeing commercial projects as safer, but also factoring that the residential market could bring higher returns if the market stabilizes soon. The manager collects the data and asks an analyst to assess the risks; that ultimately requires assessing the economics of both projects from both the bank's and the developer's perspectives. The bank could still change the interest rate on the loan to receive adequate compensation for the risk it carries, but the loan manager knows that doing so will change their long-term client willingness to take on the loan.

**DECISION ANALYSIS**

1. Introducing Decision Analysis

**Replacing El Poderoso**

Fredrik Odegaard

Publication Date: Nov 12, 2009

Discipline: Finance

Source: Richard Ivey School of Business Foundation

Product number: 909E25-PDF-ENG

Length: 2p

A professor is considering buying a new car and is evaluating two models, one with air conditioning and a comfort package, the other with no extras. The two cars are relatively close in price but still above his initial budget, and he is wondering how much he might be able to negotiate the price. A factor that complicates the matter is that the car with the comfort package has a lower interest rate. The professor therefore needs to understand what the net present value of the difference in the two payment plans is.
Sparta Glass Products

Sherwood C. Frey, Dana Clyman

Publication Date: Aug 05, 2002

Discipline: Strategy

Source: Darden School of Business

Product number: UV0363-PDF-ENG

Length: 5p

Sparta Glass Products has been losing significant market share over the last several quarters in the non-glare-glass market, with a price 10% above the competition. Lowering the price is under consideration. Unfortunately, fully allocated costs are such that the lower price results in a loss. Issues to be discussed and analyses to be conducted include the relevant costs for the decision and the reactions from competitors.

Canonical Decision Problems

George Wu, Hans Liebler

Revision Date: Mar 25, 2008

Publication Date: Apr 08, 1996

Discipline: Negotiation

Source: Exercises

Product number: 396308-PDF-ENG

Length: 14p

Involves seven canonical decision problems--basic problems in management that arise with surprising frequency. Although these exercises are simplified versions of these problems, they have been written to preserve the "essence" of the decision situations. The problems include product development sequencing, options for flexibility, market research, litigation, inventory decisions under uncertainty, bidding decisions, and choosing among theories.
2. Decision Trees

Merck & Co.: Evaluating a Drug Licensing Opportunity

Richard S. Ruback, David Krieger

Revision Date: Mar 25, 2003
Publication Date: Oct 30, 2000
Discipline: Finance
Source: HBS Premier Case Collection
Product number: 201023-PDF-ENG
Length: 6p

This explores the valuation of an opportunity to license a compound before it enters clinical trials. Describes Merck's decision tree evaluation process is presented. Information required to evaluate a specific licensing opportunity is provided, including the costs of the three phases of the review process, the revenues if approved, and the probability of various outcomes. It includes an introduction to decision tree analysis and valuation.

Gold Claim at Sturgeon Lake

Peter C. Bell, Gregory S. Zaric

Publication Date: Nov 24, 2009
Discipline: Information Technology
Source: Richard Ivey School of Business Foundation
Product number: 909E18-PDF-ENG
Length: 7p
A freelance geologist was asked for advice regarding two mining claims to property on Sturgeon Lake, near Thunder Bay, Ontario. Specifically, he was asked if there was enough gold on the property to pursue an economically feasible mining opportunity. The geologist determined that an analytical approach would best aid the analysis of the multiple factors he would need to consider in arriving at a decision about whether or not to proceed with the mining operation. The first stage in ore extraction involved building an access road, and the second stage was to implement a drilling program. There was considerable uncertainty surrounding the costs and actual feasibility of completion of these stages; yet only when these stages were completed could actual mining of the property begin. If mining proceeded, it was assumed it would take 10 years to extract all the gold from the site, and the total amount of gold in the mine would be extracted at an even rate over the 10-year period. Mining costs were assumed to be $30 an ounce, and the geologist used a discount rate of 20 per cent before taxes when evaluating projects.

**Flanders of Springfield**

Arthur Schleifer Jr.

Revision Date: Apr 20, 1994

Publication Date: Aug 04, 1993

Discipline: Negotiation

Source: Harvard Business School

Product number: 894005-PDF-ENG

Length: 8p

Flanders is a catalog merchandiser. Various decisions on catalog distribution policy, ordering and inventory policy, and catalog format design are considered. This was a final examination, and serves as a review for a number of topics in the course.

**Emergency Vehicle Positioning, Inc.**

Dana Clyman, Sherwood C. Frey

Revision Date: Aug 14, 1997

Publication Date: Jan 27, 1997
Emergency Vehicle Positioning, Inc. (EVPI) has developed a satellite-based tracking system that continuously updates and displays the location of every vehicle in its network. A recently signed contract presents new technical challenges that may make the normally installed system inadequate. While it is possible to augment the system so that it will definitely work, doing so would entail considerable cost. This case is a modified version of "Integrated Siting Systems, Inc." [UV0355]. The only difference is that the latter case provides all possible conditional probabilities, offering a slightly different introduction to Bayes Theorem. In this case, only the recent conditional probabilities are provided. Indeed, except for the name, date, final paragraph (which mentions the other probabilities), and the exhibit on conditional probabilities, the cases are identical. Therefore, the teaching note for the Integrated Siting Systems case [UV0356] is also appropriate for this case.

**Engine Services, Inc.**

Sherwood C. Frey

Revision Date: Jun 28, 2006

Publication Date: Aug 09, 2005

Discipline: General Management

Source: Darden School of Business

Product number: UV0702-PDF-ENG

Length: 6p

Engine Services, Inc., is a world-class jet-engine overhaul center. An about-to-be-published quarterly report supports the perception that the overhaul facility is providing too much value relative to contractual guarantees. The root of the problem may be the "two standard deviations rule," which is being used to provide a cushion above the guarantee. Lower targets increase the chances of costly rework but save on the costs of initial work.
3. Comparing the outcomes

**Prestige Telephone Co.**

William J. Bruns Jr.

Revision Date: Jun 11, 2003

Publication Date: May 22, 1997

Discipline: Accounting

Source: HBS Premier Case Collection

Product number: 197097-PDF-ENG

Length: 4p

An independent regulated telephone company has established a computer services subsidiary that seems to remain unprofitable. Managers must determine whether it is profitable or not and consider changes in pricing or promotion that might improve profitability. A rewritten version of an earlier case.

**Caribbean Internet Cafe**

Murray J. Bryant, Michelle Theobalds

Publication Date: Sep 09, 2009

Discipline: Accounting

Source: Richard Ivey School of Business Foundation

Product number: 998B02-PDF-ENG

Length: 5p

An entrepreneur is hoping to open Caribbean Internet Cafe in Kingston, Jamaica. He has gathered data on all the relevant costs: equipment, rent, labor, etc. He has also found a partner in the local telephone company, Jamaica Telecommunications Limited (JTL). JTL has provided equity and a long-term loan at favourable interest rates. He is now faced with the task of analyzing fixed, variable and start-up costs, contribution margin, and the concept of break-even to guide his decision.
**Salem Telephone Co.**

William J. Bruns Jr., Julie H. Hertenstein

Revision Date: Nov 01, 2005

Publication Date: Jun 07, 2004

Discipline: Accounting

Source: HBS Premier Case Collection

Product number: 104086-PDF-ENG

Length: 5p

A computer subsidiary appears to be unprofitable. Managers must determine whether it is actually unprofitable and consider whether changes in prices or promotion might improve profitability. Allows clear separation of variable costs from fixed costs. A rewritten version of an earlier case.

**Internet Rapide**

Samuel E Bodily, Jason Hull

Publication Date: Jul 23, 2003

Discipline: Information Technology

Source: Darden School of Business

Product number: UV3863-PDF-ENG

Length: 2p

This case concerns a company's advertising and redesign decisions for a DSL service. These decisions affect the switching of customers among various classifications, including those who currently use the service. The focus of the case will be on modeling the dynamics of the system and related optimal decision-making. How to structure spreadsheets using influence diagrams can be part of the discussion. The case provides an opportunity to discuss decisions using different time horizons.
4. Sensitivity Analysis

**International Guidance and Controls**

Phillip E. Pfeifer

Revision Date: Aug 01, 1993

Publication Date: Apr 05, 1991

Discipline: Operations Management

Source: Darden School of Business

Product number: UV0349-PDF-ENG

Length: 2p

Thomas Stearns must decide whether to continue with planned software development and risk missing the completion deadline on a $20 million project or bite the bullet and make some costly hardware changes that will virtually eliminate the risk of missing the deadline. This introductory decision analysis case: (1) contains a compound (square-circle-square) decision, (2) encourages a discussion of the meaning of probability, and (3) requires the use of sensitivity analysis to handle the unspecified costs of missing the deadline.

**Body Benefits**

Elizabeth M.A. Grasby, Neeta Khera

Revision Date: Sep 24, 2009

Publication Date: Mar 07, 2005

Discipline: Accounting

Source: Richard Ivey School of Business Foundation

Product number: 905B01-PDF-ENG

Length: 7p

The proprietor of a day spa must decide whether to purchase a microdermabrasion machine. This differential analysis case will test students' abilities to identify those costs that are recurring cash flows
and those costs that are investments; give practice calculating working capital investments; differentiate between relevant and non-relevant costs for a differential analysis and test students on their ability to conduct a sensitivity analysis.

**Mountain Man Brewing Co.: Bringing the Brand to Light**

Heide Abelli

Publication Date: May 28, 2007

Discipline: Marketing

Source: Harvard Business Publishing Brief Cases

Product number: 2069-PDF-ENG

Length: 12p

Chris Prangel, a recent MBA graduate, has returned home to West Virginia to manage the marketing operations of the Mountain Man Beer Company, a family-owned business he stands to inherit in five years. Mountain Man brews just one beer, Mountain Man Lager, also known as "West Virginia's beer" and popular among blue-collar workers. Due to changes in beer drinkers' taste preferences, the company is now experiencing declining sales for the first time in its history. In response, Chris wants to launch Mountain Man Light, a "light beer" formulation of Mountain Man Lager, in the hope of attracting younger drinkers to the brand. However, he encounters resistance from senior managers. Mountain Man Lager's brand equity is a key asset for Mountain Man Brewing Company. The question is whether Mountain Man Light will enhance it, detract from it, or irreversibly damage it.

**DECISION ANALYSIS II**

**1. Conditional Probabilities**

*Integrated Siting Systems, Inc.*

Sherwood C. Frey, Dana Clyman

Revision Date: Jul 31, 1997

Publication Date: Sep 08, 1993
Integrated Siting Systems, Inc. has developed a satellite-based tracking system that continuously updates and displays the location of every vehicle in its network. A recently signed contract presents new technical challenges that may make the normally installed system inadequate. While it is possible to augment the system so that it will definitely work, doing so is costly. Alternatively, it is possible to conduct an imperfect test that will improve the company's information about whether the normal system will work. An alternative to this system is Emergency Vehicle Positioning, Inc. (see UV0359). Except for the name, date, final paragraph (which mentions the other conditional probabilities), and the exhibit of conditional probabilities, the two cases are identical.

2. The Value of Information

Creating Business Value with Analytics

David Kiron, Rebecca Shockley

Publication Date: Oct 01, 2011

Discipline: Operations Management

Source: MIT Sloan Management Review

Product number: SMR403-PDF-ENG

Length: 7p

As the data deluge continues to grow, more companies are under increasing pressure to develop systems that create both business value and competitive advantage. According to a survey conducted by MIT Sloan Management Review, in partnership with IBM Institute for Business Value, more than 58% of the more than 4,500 respondents said their companies were gaining competitive value from analytics - up from just 37% who thought this last year. The authors found that rather than having the right tools, technology and people, organizational factors are one of the most important predictors of the ability to create competitive advantage. Managers who responded to the survey cite management support for analytics, including top-down mandates, and having analytics sponsors and champions as key, in addition to practices such as using analytics to identify and address strategic threats and opportunities.
Data-oriented organizational cultures have three key characteristics: (1) analytics is used as a strategic asset, (2) management supports analytics throughout the organizations and (3) insights are widely available to those who need them. In addition, organizations that excel at using analytics are sophisticated in their information management, and possess real analytics expertise. The path to developing these competencies takes time and has distinct challenges. The authors summarize each, and propose ways to assess current organizational culture and choose the approach with the best likelihood of success.

3. Risk Analysis

Lac Leman Festival de la Musique (A)

Samuel E Bodily, Robert Jenkins

Publication Date: Sep 11, 2007

Discipline: Entrepreneurship

Source: Darden School of Business

Product number: UV0840-PDF-ENG

Length: 4p

The organizers of a music festival may use video from the Friday concert to create a DVD to sell to those who come to the Saturday concert. Attendance on Saturday is uncertain, as is the percentage of those who attend on Saturday who will buy the DVD. Is this a good project? If so, what number of DVDs should be burned early Saturday morning and offered for sale at that evening's performance? By that time, Friday attendance is known, as well as whether it rained on Friday, and there is a forecast for whether it will rain on Saturday. Historical information on these variables may help us predict Saturday attendance using multiple regression; together with the results of a marketing survey, such analysis will help us make better purchasing decisions. This case series (see also the B case, UV0841) can be used to illuminate a multitude of concepts that are covered in basic decision-analysis courses. The series starts by examining the role of uncertainty in decision making, proceeds through the estimation of probability distributions from sample data with multiple regression, culminates in the development of a full decision model, and ends with a qualitative and quantitative analysis (with a tornado diagram) of how to add value and reduce risk. Key pitfalls for students are failing to recognize both limits on sales (supply and demand), incomplete reasoning in the determination of the attendance probability distribution, and oversimplifying the full forecast model (i.e., averaging the Saturday rain/no Saturday rain outcomes, rather than incorporating the uncertainty explicitly into the simulation).
**Midland Energy Resources, Inc.: Cost of Capital (Brief Case)**

Timothy A. Luehrman, Joel L. Heilprin

Publication Date: Jun 19, 2009

Discipline: Finance

Source: Harvard Business Publishing Brief Cases

Product number: 4129-PDF-ENG

Length: 12p

Finance, Capital Asset Pricing Model (CAPM), Weighted Average Cost of Capital (WACC), Capital Structure, Risk Assessment, Corporate Finance, Cash Flow, Valuation, Beta, North America, Energy, Oil and Gas, Cost of Capital, Cost of Equity, Discount Rate, Risk Premium, Market Risk Premium, Discounted Cash Flow (DCF)

The senior vice president of project finance for a global oil and gas company must determine the weighted average cost of capital for the company as a whole and each of its divisions as part of the annual capital budgeting process. The case uses comparable companies to estimate asset betas for each operating division, and employs the Capital Asset Pricing Model to determine the cost of equity. Students are required to un-lever and re-lever betas and, choose an appropriate risk-free rate, and compute costs of debt and equity.

**Country Risk Analysis and Managing Crises: Tower Associates**

F. John Mathis, Paul G. Keat, John O'Connell

Publication Date: Oct 21, 2007

Discipline: Finance

Source: Thunderbird School of Global Management

Product number: TB0087-PDF-ENG

Length: 9p

This case study is based on the actual experiences of several companies that we have worked with that want to expand their business into emerging markets. The case outlines and illustrates a framework of analysis that focuses on assessing foreign exchange rate risks, country risk analysis, and management's
decision-making process in selecting a target country and about managing the risks associated with this decision. The case provides data on four possible target countries for which methods of forecasting exchange rates (PPP, IRP, IFE, B/P) can be used. The case also provides the opportunity for assessing whether a government is pursuing appropriate macroeconomic policies to avoid crises. Finally, the case allows for an evaluation of the probability of a foreign exchange, financial, foreign debt, and banking crisis in one or more of the four countries. While the case can be used to study macroeconomic policy decisions, its real purpose is to examine management's decision-making process to identify and manage possible risks associated with expanding into emerging markets.

**Learning to Live with Complexity**

Gokce Sargut, Rita Gunther McGrath

Publication Date: Sep 01, 2011

Discipline: Strategy

Source: Harvard Business Review

Product number: R1109C-PDF-ENG

Length: 10p

Business life has always featured the unpredictable, the surprising, and the unexpected. But in today's hyperconnected world, complexity is the norm. Systems that used to be separate are now intertwined and interdependent, and knowing the starting conditions is no guide to predicting outcomes; too many continuously changing interactive elements are in play. Managers looking to navigate these difficulties need to adopt new approaches. They should drop outmoded forecasting tools—for example, ones that rely on averages, which are often less important than outliers. Instead, they should use models that simulate the behavior of the system. They should also make sure that their data include a good amount of future-oriented information. Risk mitigation is crucial as well. Managers should minimize the need to rely on predictions—for instance, they can give users a say in product design. They can decouple elements in a system and build in redundancy to minimize the consequences of a partial system failure, and turn to outside partners to extend their own company's capabilities. They can complement hard analysis with "soft" methods such as storytelling to make potentially important future possibilities more real. And they can make trade-offs that keep early failures small and provide the diversity of thought needed in a nimble organization faced with complexity on virtually every front.