

---

## References

- ABRAHAM, B. and J. LEDOLTER (1983): *Statistical Methods for Forecasting*. Wiley, New York.
- ADAMS, M. and D. BOIKE (2004): *PDMA Foundation's Comparative Performance Assessment Study (CPAS)*. Tech. rep., PDMA Foundation.
- ALBACH, H. (1993): *Culture and Technical Innovation*. Walter de Gruyter, Berlin.
- AMRAM, M. and N. KULATILAKA (1999): *Real Options - Managing Strategic Investment in an Uncertain World*. 1st ed., Harvard Business School Press, Boston, MA.
- ANTELMAN, G. (1997): *Elementary Bayesian Statistics*. 1st ed., Edward Elgar Publishing Ltd., Cheltenham (UK).
- ARMSTRONG, M., W. BAILEY, and B. COUET (2005): The Option Value of Acquiring Information in an Oilfield Production Enhancement Project. *Journal of Applied Corporate Finance* 17(2), pp. 99–104.
- ATHEY, S., P. MILGROM, and J. ROBERTS (1998): *Robust Comparative Statics*. Monograph, Stanford University, Stanford.
- ATUAHENE-GIMA, K. (1995): An explorative analysis of the impact of market orientation on new product performance. *Journal of product innovation management* 12(4), pp. 275–293.
- AZOURY, K. S. (1985): Bayes Solution to Dynamic Inventory Models under Unknown Demand Distribution. *Management Science* 31(9), pp. 1150–1160.
- AZOURY, K. S. and B. L. MILLER (1984): A Comparison of the Optimal Ordering Levels of Bayesian and Non-Bayesian Inventory Models. *Management Science* 30(8), pp. 993–1003.
- BAECKER, P., U. HOMMEL, and H. LEHMANN (2003): Marktorientierte Investitionsrechnung bei Unsicherheit, Flexibilität, und Irreversibilität. In: U. HOMMEL, M. SCHOLICH, and P. BAECKER (eds.), *Reale Optionen*, Springer, Berlin, pp. 15–35.
- BALBONTIN, A., B. YAZDANI, R. COOPER, and W. E. SOUDER (1999): New product development success factors in American and British firms. *International Journal of Technology Management* 17(3), pp. 259–280.
- BALDWIN, C. Y. and K. B. CLARK (1998): *Modularity in Design: an Analysis based on the Theory of Real Options*. Working paper, Harvard Business School.

- BALDWIN, C. Y. and K. B. CLARK (2002): The option value of Modularity in Design. In: C. Y. BALDWIN and K. B. CLARK (eds.), *Design Rules, Volume 1: The Power of Modularity*, MIT Press, Cambridge, MA.
- BAYES, T. (1764): An Essay Toward Solving a Problem in the Doctrine of Chances. *Philosophical Transactions of the Royal Society of London* 53, pp. 370–418.
- BEARDSLEY, G. and E. MANSFIELD (1978): A Note on the Accuracy of Industrial Forecasts of the Profitability of New Products and Processes. *Journal of Business* 51(1), pp. 127–135.
- BELLALAH, M. (2001): Irreversibility, sunk costs and investment under incomplete information. *R&D Management* 31(2), pp. 115–126.
- BERGER, J. O. (1985): *Statistical Decision Theory and Bayesian Analysis*. Springer Series in Statistics, 2nd ed., Springer-Verlag, New York.
- BERNARDO, J. M. and A. F. M. SMITH (2000): *Bayesian Theory*. Wiley Series in Probability and Statistics, 1st ed., John Wiley & Sons, Chichester.
- BERNOULLI, D. (1738): Specimen theoriae novae de mensura sortis. *Commentarii Academiae Scientiarum Imperialis Petropolitanae* 5, pp. 175–192, translated by L. Sommer (1954): Exposition of a new theory of the measurement of risk. *Econometrica* 22 (1), pp. 123–136.
- BERTSEKAS, D. P. (2000): *Dynamic Programming and Optimal Control*. 2nd ed., Athena Scientific, Belmont, MA.
- BHATTACHARYA, S., V. KRISHNAN, and V. MAHAJAN (1998): Managing New Product Definition in Highly Dynamic Environments. *Management Science* 44(11), pp. S50–S64.
- BIRGE, J. R. (2000): Option Methods for Incorporating Risk into Linear Capacity Planning Models. *Manufacturing & Service Operations Management* 2(1), pp. 19–31.
- BIRGE, J. R. and F. LOUVEAUX (1997): *Introduction to Stochastic Programming*. Springer, New York.
- BLACK, F. and M. SCHOLES (1973): The Pricing of Options and Corporate Liabilities. *Journal of Political Economy* 81(3), pp. 637–654.
- BONINI, C. P. (1977): Capital Investment under Uncertainty with Abandonment Options. *Journal of Financial and Quantitative Analysis* 12(1), pp. 39–51.
- BREALEY, R. A. and S. C. MYERS (1996): *Principles of Corporate Finance*. 5th ed., McGraw-Hill, New York.
- BRENNAN, M. J. and E. S. SCHWARTZ (1985): Evaluating Natural Resource Investments. *Journal of Business* 58(2), pp. 135–157.
- BROCKHOFF, K. (1997a): *Forschung und Entwicklung*. 4th ed., Oldenbourg, München.
- BROCKHOFF, K. (1997b): Wenn der Kunde stört – Differenzierungsnotwendigkeiten bei der Einbeziehung von Kunden in die Produktentwicklung. In: M. BRUHN and H. STEFFENHAGEN (eds.), *Marktorientierte Unternehmensführung*, Gabler, Wiesbaden, pp. 351–370.
- BROCKHOFF, K. (1999): *Produktpolitik*. 4th ed., Lucius & Lucius, Stuttgart.
- BROCKHOFF, K. (2000): Problems of Evaluating R&D Projects as Real Options. In: M. FRENKEL, U. HOMMEL, and M. RUDOLF (eds.), *Risk Management*, Springer, Berlin, pp. 203 – 212.
- BRONSTEIN, I. N., K. A. SEMENDJAEV, G. MUSIOL, and H. MÜHLIG (1999): *Taschenbuch der Mathematik*. 4th ed., Harri Deutsch, Frankfurt am Main.

- BROWN, S. L. and K. M. EISENHARDT (1995): Product development: Past research, present findings, and future directions. *Academy of Management Review* 20(2), pp. 343–379.
- BÜYÜKÖZKAN, G. and O. FEYZIOGLU (2004): A fuzzy-logic-based decision-making approach for new product development. *International Journal of Production Economics* 90(1), pp. 27–45.
- CARBONELL-FOULQUIÉ, P., J. L. MUNUERA-ALEMÁN, and A. I. RODRÍGUEZ-ESCUADERO (2004): Criteria employed for go/no-go decisions when developing successful highly innovative products. *Industrial Marketing Management* 33(4), pp. 307–316.
- CARLIN, B. P. and T. A. LOUIS (2000): *Bayes and Empirical Bayes Methods for Data Analysis*. Texts in Statistical Science, 2nd ed., Chapman & Hall, New York.
- CHEN, F. and J.-S. SONG (2001): Optimal Policies for Multi-Echelon Inventory Problems with Markov Modulated Demand. *Operations Research* 49(2), pp. 226–234.
- CHILDS, P. D., S. H. OTT, and A. J. TRIANTIS (1998): Capital Budgeting for Interrelated Projects - A Real Options Approach. *Journal of Financial and Quantitative Analysis* 33(3), pp. 305–334.
- CHILDS, P. D. and A. J. TRIANTIS (1999): Dynamic R&D Investment Policies. *Management Science* 45(10), pp. 1359–1377.
- COOPER, R. G. (1994): Third-Generation New Product Processes. *Journal of Product Innovation Management* 11(1), pp. 3–14.
- COOPER, R. G., S. J. EDGETT, and E. J. KLEINSCHMIDT (2004): Benchmarking best NPD practices – II: Strategy, resource allocation and portfolio management. *Research Technology Management* 47(3), pp. 50–59.
- COOPER, R. G. and E. J. KLEINSCHMIDT (1994): Determinants of timeliness in product development. *Journal of Product Innovation Management* 11(5), pp. 381–391.
- COOPER, R. G. and E. J. KLEINSCHMIDT (1995): Benchmarking the Firm's Critical Success Factors in New Product Development. *Journal of Product Innovation Management* 12(5), pp. 374–391.
- COOPER, R. G. and E. J. KLEINSCHMIDT (1996): Winning businesses in product development: The critical success factors. *Research Technology Management* 39(4), pp. 18–29.
- COPELAND, T. E. and V. ANTIKAROV (2001): *Real Options - A Practitioner's Guide*. 1st ed., Texere, New York.
- CORTAZAR, G. and E. S. SCHWARTZ (1998): Evaluating environmental investments: A real options approach. *Management Science* 44(8), pp. 1059–1070.
- CORTAZAR, G., E. S. SCHWARTZ, and J. CASASSUS (2001): Optimal exploration investment under price and geological-technical uncertainty: a real options model. *R&D Management* 31(2), pp. 181–189.
- COX, J. C. and S. A. ROSS (1976): The Valuation of Options for Alternative Stochastic Processes. *Journal of Financial Economics* 3(1/2), pp. 145–166.
- COX, J. C., S. A. ROSS, and M. RUBINSTEIN (1979): Option Pricing: A Simplified Approach. *Journal of Financial Economics* 7(3), pp. 229–263.
- DAHAN, E. and H. MENDELSON (2001): An Extreme-Value Model of Concept Testing. *Management Science* 47(1), pp. 102–116.

- DAHAN, E. and V. SRINIVASAN (2000): The Predictive Power of Internet-Based Product Concept Testing Using Visual Depiction and Animation. *Journal of Product Innovation Management* 17(2), pp. 99–109.
- DATAR, S. and C. JORDAN (1997): New product development structures and time-to-market. *Management Science* 43(4), pp. 452–465.
- DEGROOT, M. H. (2004): *Optimal Statistical Decisions*. 1st ed., John Wiley & Sons, Chichester.
- DIXIT, A. K. and R. S. PINDYCK (1994): *Investment under Uncertainty*. 1st ed., Princeton University Press, Princeton.
- DVORETZKY, A., J. KEIFER, and J. WOLFOWITZ (1952): The inventory problem: II. Case of unknown distributions of demand. *Econometrica* 20(2), pp. 450–466.
- EPPEN, G. D. and A. V. IYER (1997): Improved fashion buying with Bayesian updates. *Operations Research* 45(6), pp. 805–820.
- ERNST, H. (2002): Success Factors of New Product Development: A Review of the Empirical Literature. *International Journal of Management Reviews* 4(1), pp. 1–40.
- ETHIRAJ, S. K. and D. LEVINTHAL (2004): Modularity and Innovation in Complex Systems. *Management Science* 50(2), pp. 159–173.
- FISHER, M. and A. RAMAN (1996): Reducing the Cost of Demand Uncertainty Through Accurate Response to Early Sales. *Operations Research* 44(1), pp. 87–99.
- GARTNER, W. B. and R. J. THOMAS (1993): Factors Affecting New Product Forecasting Accuracy in New Firms. *Journal of Product Innovation Management* 10(1), pp. 35–52.
- GAUR, V., A. GILONI, and S. SESHADRI (2005): Information Sharing in a Supply Chain Under ARMA Demand. *Management Science* 51(6), pp. 961–969.
- GERWIN, D. and G. SUSMAN (1996): Special issue on concurrent engineering. *IEEE Transactions on Engineering Management* 43(2), pp. 118–123.
- GESKE, R. S. (1979): The Valuation of Compound Options. *Journal of Financial Economics* 7(1), pp. 63–81.
- GIRLICH, H.-J. and A. CHIKAN (2001): The origins of dynamic inventory modelling under uncertainty (the men, their work and connection with the Stanford Studies). *International Journal of Production Economics* 71(1-3), pp. 351–363.
- GRAHAM, J. R. and C. R. HARVEY (2001): The theory and practice of corporate finance: evidence from the field. *Journal of Financial Economics* 60(2/3), pp. 187–243.
- GRENADIER, S. R. (1999): Information revelation through option exercise. *Review of Financial Studies* 12(1), pp. 95–129.
- GRIFFIN, A. (1997a): *Drivers of NPDP Success: The PDMA Report 2007*. Tech. rep., PDMA Foundation.
- GRIFFIN, A. (1997b): PDMA Research on New Product Development Practices: Updating Trends and Benchmarking Best Practices. *Journal of Product Innovation Management* 14(6), pp. 429–458.
- GRIFFIN, A. and J. R. HAUSER (1993): The Voice of the Customer. *Marketing Science* 12(1), pp. 1–27.
- GRIFFIN, A. and J. R. HAUSER (1996): Integrating R&D and Marketing: A Review and Analysis of the Literature. *Journal of Product Innovation Management* 13(3), pp. 191–215.

- GRUNER, K. E. and C. HOMBURG (2000): Does Customer Interaction Enhance New Product Success? *Journal of Business Research* 49(1), pp. 1–14.
- GURNANI, H. and C. S. TANG (1999): Note: Optimal Ordering Decisions with Uncertain Cost and Demand Forecast Updating. *Management Science* 45(10), pp. 1456–1462.
- HA, A. Y. and E. L. PORTEUS (1995): Optimal timing of reviews in concurrent design for manufacturability. *Management Science* 41(9), pp. 1431–1447.
- HALEY, G. T. and S. M. GOLDBERG (1995): Net Present Value Techniques and Their Effects on New Product Research. *Industrial Marketing Management* 24(3), pp. 177–190.
- HAMMOND, J. H. (1990): *Quick Response in the Apparel Industry*. Harvard Business School Case N9-690-038, Cambridge, MA.
- HAUSMAN, W. H. and R. PETERSON (1972): Multiproduct production scheduling for style goods with limited capacity, forecast revisions and terminal delivery. *Management Science* 18(7), pp. 370–383.
- HE, H. and R. S. PINDYCK (2002): Investments in flexible production capacity. *Journal of Economic Dynamics and Control* 16(3–4), pp. 575–599.
- HERATH, H. S. B. and C. S. PARK (2001): Real Options Valuation and Its Relationship to Bayesian Decision-Making Methods. *Engineering Economist* 46(1), pp. 1–32.
- VON HIPPEL, E. (1986): Lead Users: A Source of Novel Product Concepts. *Management Science* 32(7), pp. 791–805.
- VON HIPPEL, E. (1990): Task Partitioning: An Innovation Process Variable. *Research Policy* 19(5), pp. 407–418.
- VON HIPPEL, E. (1992): *Adapting market research to the rapid evolution of needs for new products and services*. Working paper, Massachusetts Institute of Technology, Cambridge, MA.
- HOLMAN, R., H.-W. KAAS, and D. KEELING (2003): The future of product development. *The McKinsey Quarterly* (3), pp. 28–40.
- HUANG, G. Q. and K. L. MAK (1998): Re-Engineering the Product Development Process with 'design for X'. *Proceedings of the Institution of Mechanical Engineers – Part B – Engineering Manufacture* 212(4), pp. 259–268.
- HUCHZERMEIER, A. and M. A. COHEN (1996): Valuing operational flexibility under exchange rate risk. *Operations Research* 44(1), pp. 100–114.
- HUCHZERMEIER, A. and C. H. LOCH (2001): Project Management Under Risk: Using the Real Options Approach to Evaluate Flexibility in R&D. *Management Science* 47(1), pp. 85–101.
- HULL, J. C. (2003): *Options, Futures and Other Derivatives*. 5th ed., Prentice Hall, Upper Saddle River, NJ.
- HUNTER, A. (1990): *Quick Response in Apparel Manufacturing*. The Textile Institute, Manchester, U.K.
- IANSITI, M. (1995): Technology Development and Integration: An Empirical Study of the Interaction between Applied Science and Product Development. *IEEE Transactions on Engineering Management* 42(3), pp. 259–269.
- IGLEHART, D. L. (1964): The Dynamic Inventory Problem with Unknown Demand Distribution. *Management Science* 10(3), pp. 429–440.

- INGERSOLL, J. E. and S. A. ROSS (1992): Waiting to invest: Investment and uncertainty. *Journal of Business* 65(1), pp. 1–29.
- IYER, A. V. and M. E. BERGEN (1997): Quick Response in Manufacturer-Retailer Channels. *Management Science* 43(4), pp. 559–570.
- JOHNSON, G. D. and H. E. THOMPSON (1975): Optimality of myopic inventory policies for certain dependent demand processes. *Management Science* 21(11), pp. 1303–1307.
- KAHN, J. A. (1987): Inventories and the Volatility of Production. *American Economic Review* 77(4), pp. 667–679.
- KAHN, K. B. (2002): An exploratory Investigation of new product forecasting practices. *Journal of Product Innovation Management* 19(2), pp. 133–143.
- KALYANARAM, G. and V. KRISHNAN (1997): Deliberate product definition: Customizing the product definition process. *Journal of Marketing Research* 34(2), pp. 276–285.
- KAMRAD, B. and R. ERNST (2001): An economic model for evaluating mining and manufacturing ventures with output yield uncertainty. *Operations Research* 49(5), pp. 690–699.
- KARR, A. F. (1991): *Point Processes and Their Statistical Inference*. 2nd ed., Marcel Dekker, New York.
- KESTER, W. C. (1984): Today's options for tomorrow's growth. *Harvard Business Review* 62(2), pp. 153–160.
- KIM, H.-S. (2003): A Bayesian Analysis on the Effect of Multiple Supply Options in a Quick Response Environment. *Naval Research Logistics* 50, pp. 937–952.
- KOGUT, B. and N. KULATILAKA (1994): Operating Flexibility, Global Manufacturing, and the Option Value of a Multinational Network. *Management Science* 40(1), pp. 123–139.
- KRISHNAN, V. and S. BHATTACHARYA (2002): Technology Selection and Commitment in New Product Development: The Role of Uncertainty and Design Flexibility. *Management Science* 48(3), pp. 313–328.
- KRISHNAN, V., S. D. EPPINGER, and D. E. WHITNEY (1997): A model-based framework to overlap product development activities. *Management Science* 43(4), pp. 437–451.
- KRISHNAN, V. and C. H. LOCH (2005): Introduction to the Special Issue: Management of Product Innovation. *Production and Operations Management* 14(3), pp. 269–271.
- KRISHNAN, V. and K. T. ULRICH (2001): Product Development Decisions: A Review of the Literature. *Management Science* 47(1), pp. 1–21.
- KULATILAKA, N. (1988): Valuing the Flexibility of Flexible Manufacturing Systems. *IEEE Transactions on Engineering Management* 35(4), pp. 250–257.
- KULATILAKA, N. (1993): The value of flexibility: The case of a dual-fuel industrial steam boiler. *Financial Management* 22(3), pp. 271–281.
- KULATILAKA, N. (1995): Operating Flexibilities in Capital Budgeting: Substitutability and Complementarity in Real Options. In: L. TRIGEORGIS (ed.), *Real Options in Capital Investment*, 1st ed., Praeger, Westport, Connecticut, pp. 121–132.
- KULATILAKA, N. and A. MARCUS (1992): Project Valuation under Uncertainty: When does DCF Fail? *Journal of Applied Corporate Finance* 5(3), pp. 92–100.



- LANDER, D. M. and G. E. PINCHES (1998): Challenges to the Practical Implementation of Modeling and Valuing Real Options. *Quarterly Review of Economics & Finance* 38(4), pp. 537–567.
- LARIVIERE, M. A. and E. L. PORTEUS (1999): Stalking Information: Bayesian Inventory Management with Unobserved Lost Sales. *Management Science* 45(3), pp. 346–363.
- LAUX, H. (1991): *Entscheidungstheorie I*. 2nd ed., Springer, Berlin.
- LEE, H. L., V. PADMANABHAN, and S. WHANG (1997): Information distortion in a supply chain: The bullwhip effect. *Management Science* 43(4), pp. 546–558.
- LEE, H. L., K. C. SO, and C. S. TANG (2000): The Value of Information Sharing in a Two-Level Supply Chain. *Management Science* 46(5), pp. 626–643.
- LEVITT, R. E., J. THOMSEN, T. R. CHRISTIANSEN, J. C. KUNZ, Y. JIN, and C. NASS (1999): Simulating Project Work Processes and Organizations: Toward a Micro-Contingency Theory of Organizational design. *Management Science* 45(11), pp. 1479–1495.
- LINT, O. and E. PENNING (2001): An option approach to the new product development process: a case study at Philips Electronics. *R&D Management* 31(2), pp. 163–172.
- LIPPMAN, S. A. and K. F. MCCARDLE (1987): Does Cheaper, Faster, or Better Imply Sooner in the Timing of Innovation Decision? *Management Science* 33(8), pp. 1058–1064.
- LIPPMAN, S. A. and K. F. MCCARDLE (1991): Uncertain Search: A Model of Search among Technologies of Uncertain Values. *Management Science* 37(11), pp. 1474–1490.
- LITTLE, A. D. (2004): *Innovation Excellence Studie*. Tech. rep., Arthur D. Little.
- LOCH, C. H. and K. BODE-GREUEL (2001): Evaluating Growth Options as Sources of Value for Pharmaceutical Research Projects. *R&D Management* 31(2), pp. 231–248.
- LOCH, C. H. and C. TERWIESCH (1998): Communication and uncertainty in concurrent engineering. *Management Science* 44(8), pp. 1032–1048.
- LOCH, C. H. and C. TERWIESCH (2005): Rush and Be Wrong or Wait and Be Late? A Model of Information in Collaborative Processes. *Production and Operations Management* 14(3), pp. 331–343.
- LOVEJOY, W. S. (1990): Myopic Policies for Some Inventory Models with Uncertain Demand Distributions. *Management Science* 36(6), pp. 724–738.
- LYNN, G. S., S. P. SCHNAARS, and R. B. SKOV (1999): Survey of New Product Forecasting Practices in Industrial High Technology and Low Technology Businesses. *Industrial Marketing Management* 28(6), pp. 565–571.
- MACCORMACK, A. and R. VERGANTI (2003): Managing the Sources of Uncertainty: Matching Process and Context in Software Development. *Journal of Product Innovation Management* 20(3), pp. 217–232.
- MAHAJAN, V. and E. MULLER (1990): New Product Diffusion Models in Marketing: A Review and Directions for Research. *Journal of Marketing* 54(1), pp. 1–26.
- MAHAJAN, V. and J. WIND (1992): New Product Models: Practice, Shortcomings and Desired Improvements. *Journal of Product Innovation Management* 9(2), pp. 128–139.
- MAMER, J. W. and K. F. MCCARDLE (1987): Uncertainty, Competition, and the Adoption of New Technology. *Management Science* 33(2), pp. 161–177.

- MARSCHAK, J. and R. RADNER (1972): *Economic Theory of Teams*. 1st ed., Yale University Press, New Haven.
- MARSCHAK, T. and R. R. NELSON (1962): Flexibility, Uncertainty, and Economic Theory. *Metroeconomica* 14, pp. 42–58.
- MARTZOUKOS, S. H. and L. TRIGEORGIS (2001): *Resolving a Real Options Paradox with Incomplete Information: After All, Why Learn?*. Working paper, University of Cyprus, Nicosia Cyprus.
- MASON, S. and R. C. MERTON (1985): The Role of Contingent Claims Analysis in Corporate Finance. In: E. ALTMAN and M. SUBRAHMANYAM (eds.), *Recent Advances in Corporate Finance*, Irwin, Homewood, IL, pp. 7–54.
- MCCARDLE, K. F. (1985): Information Acquisition and the Adoption of New Technology. *Management Science* 31(11), pp. 1372–1389.
- MCDONALD, R. L. (2003): *Derivatives Markets*. Addison Wesley, Boston, MA.
- MCDONALD, R. L. and D. R. SIEGEL (1985): Investment and the Valuation of Firms When There Is an Option to Shut Down. *International Economic Review* 26(2), pp. 331–349.
- MCDONALD, R. L. and D. R. SIEGEL (1986): The Value of Waiting to Invest. *Quarterly Journal of Economics* 101(4), pp. 707–727.
- MERKHOFFER, M. W. (1977): The Value of Information Given Decision Flexibility. *Management Science* 23(7), pp. 716–727.
- MERTON, R. C. (1973): Theory of rational option pricing. *Bell Journal of Economics & Management Science* 4(1), pp. 141–183.
- MEYER, M. H. and J. M. UTTERBACK (1995): Product development cycle time and commercial success. *IEEE Transactions on Engineering Management* 42(4), pp. 297–304.
- MILGROM, P. and C. SHANNON (1994): Monotone Comparative Statics. *Econometrica* 62(1), pp. 157–180.
- MILLER, L. T. and C. S. PARK (2002): Decision Making under Uncertainty - Real Options to the Rescue? *Engineering Economist* 47(2), pp. 105–150.
- MILLER, L. T. and C. S. PARK (2005): A Learning Real Options Framework with Application to Process Design and Capacity Planning. *Production and Operations Management* 14(1), pp. 5–20.
- MISHRA, S., D. KIM, and D. H. LEE (1996): Factors Affecting New Product Success: Cross-Country Comparisons. *Journal of Product Innovation Management* 13(6), pp. 530–550.
- MONTOYA-WEISS, M. M. and R. CALANTONE (1994): Determinants of New Product Performance: A Review and Meta-Analysis. *Journal of Product Innovation Management* 11(5), pp. 397–417.
- MURMANN, P. A. (1994): Expected Development Time Reductions in the German Mechanical Engineering Industry. *Journal of Product Innovation Management* 11(3), pp. 236–252.
- MURTO, P. (2004): Valuing Options to Learn: Optimal Timing of Information Acquisition. In: *Proceedings of the 8th Annual International Conference on Real Options*, Montréal, Canada.
- MYERS, S. C. (1976): Using simulation for risk analysis. In: S. C. MYERS (ed.), *Modern Developments in Financial Management*, Praeger, New York.



- MYERS, S. C. (1977): Determinants of Corporate Borrowing. *Journal of Financial Economics* 5(2), pp. 147–176.
- MYERS, S. C. (1984): Finance Theory and Financial Strategy. *Interfaces* 14(1), pp. 126–137.
- MYERS, S. C. and S. MAJD (1990): Abandonment value and project life. *Advances in Futures and Options Research* 4(1-21).
- NAHMIA, S. (1997): *Production and Operations Analysis*. 3rd ed., Irwin, Homewood, IL.
- VON NEUMANN, J. and O. MORGENTHAU (1944): *Theory of Games and Economic Behavior*. Princeton University Press, Princeton, NJ.
- NEWTON, D. P., D. A. PAXSON, and A. W. PEARSON (1996): Real R&D options. In: A. BELCHER, J. HASSARD, and S. J. PROCTER (eds.), *R&D Decisions: Strategy, Policy and Innovations*, Routledge, London, pp. 273–282.
- NUSSBAUM, B., R. BERNER, and D. BRADY (2005): Get Creative. *Business Week* (3945), pp. 60–68.
- OTTUM, B. D. and W. L. MOORE (1997): The role of market information in new product success/failure. *Journal of Product Innovation Management* 14(4), pp. 258–273.
- PICH, M. T., C. H. LOCH, and A. DE MEYER (2002): On Uncertainty, Ambiguity, and Complexity in Project Management. *Management Science* 48(8), pp. 1008–1023.
- PINDYCK, R. S. (1988): Irreversible Investment, Capacity Choice, and the Value of the Firm. *American Economic Review* 78(5), pp. 969–985.
- POLK, R., R. E. PLANK, and D. A. REID (1996): Technical Risk and New Product Success: An Empirical Test in High Technology Business Markets. *Industrial Marketing Management* 25(6), pp. 531–543.
- RIEK, R. F. (2001): From experience: Capturing hard-won NPD lessons in checklists. *Journal of Product Innovation Management* 18(5), pp. 301–313.
- ROSSI, P. E., G. M. ALLENBY, and R. McCULLOCH (2005): *Bayesian Statistics and Marketing*. 1st ed., John Wiley & Sons, Hoboken, NJ.
- ROTHWELL, R., C. FREEMAN, and A. HORLSEY (1974): SAPPHO updated - project SAPPHO phase II. *Research Policy* 3(3), pp. 258–291.
- SANTIAGO, L. P. and T. G. BIFANO (2005): Management of R&D Projects Under Uncertainty: A Multidimensional Approach to Managerial Flexibility. *IEEE Transactions on Engineering Management* 52(2), pp. 269–280.
- SANTIAGO, L. P. and P. VAKILI (2005): On the Value of Flexibility in R&D Projects. *Management Science* 51(8), pp. 1206–1218.
- SAVAGE, L. J. (1954): *The Foundations of Statistics*. John Wiley & Sons, New York.
- SCARF, H. E. (1959): Bayes Solutions of the Statistical Inventory Problem. *Annals of Mathematical Statistics* 30(2), pp. 490–508.
- SCARF, H. E. (1960): Some Remarks on Bayes Solutions of the Statistical Inventory Problem. *Naval Research Logistics Quarterly* 7, pp. 591–596.
- SCHRÖDER, H.-H. and A. J. JETTER (2003): Integrating market and technological knowledge in the fuzzy front end: an FCM-based actions support system. *International Journal of Technology Management* 26(5/6), pp. 517–539.
- SESHADRI, S. and M. SUBRAHMANYAM (2005): Introduction to the Special Issue on "Risk Management in Operations". *Production and Operations Management* 14(1), pp. 1–4.

- SETHI, S. P., H. YAN, and H. ZHANG (2005): *Inventory and supply chain management with forecast updates*. Springer, New York.
- SHELLEY, C. J. and D. R. WHEELER (1991): New product forecasting horizons and accuracy. *Review of Business* 12(4), pp. 13–18.
- SMITH, J. E. and K. F. MCCARDLE (1998): Valuing oil properties: Integrating option pricing and decision analysis approaches. *Operations Research* 46(2), pp. 198–217.
- SMITH, J. E. and R. F. NAU (1995): Valuing risky projects: Option pricing theory and decision analysis. *Management Science* 41(5), pp. 795–816.
- SMITH, R. P. and S. D. EPPINGER (1997): A predictive model of sequential iteration in engineering design. *Management Science* 43(8), pp. 1104–1120.
- SOBEK, D. K., A. C. WARD, and J. K. LIKER (1999): Toyota's principles of set-based concurrent engineering. *Sloan Management Review* 40(2), pp. 67–83.
- SOMMER, S. C. and C. H. LOCH (2004): Selectionism and Learning in Projects with Complexity and Unforeseeable Uncertainty. *Management Science* 50(10), pp. 1334–1347.
- SOUDER, W. E. and R. K. MOENAERT (1992): Integrating Marketing and R&D Project Personnel within Innovation Projects: An Information Uncertainty Model. *Journal of Management Studies* 29(4), pp. 485–512.
- SRINIVASAN, V., W. S. LOVEJOY, and D. BEACH (1997): Integrated product design for marketability and manufacturing. *Journal of Marketing Research* 34(1), pp. 154–163.
- TAKEUCHI, H. and I. NONAKA (1986): The new new product development game. *Harvard Business Review* 64(1), pp. 137–146.
- TERWIESCH, C., C. H. LOCH, and A. DE MEYER (2002): Exchanging Preliminary Information in Concurrent Engineering: Alternative Coordination Strategies. *Organization Science* 13(4), pp. 402–420.
- THOMKE, S. H. (1997): The role of flexibility in the development of new products: An empirical study. *Research Policy* 26(1), pp. 105–119.
- THOMKE, S. H. (1998): Managing experimentation in the design of new products. *Management Science* 44(6), pp. 743–763.
- THOMKE, S. H. and D. E. BELL (2001): Sequential Testing in Product Development. *Management Science* 47(2), pp. 308–323.
- TRIGEORGIS, L. (1993): The Nature of Option Interactions and the Valuation of Investments with Multiple Real Options. *Journal of Financial & Quantitative Analysis* 28(1), pp. 1–20.
- TRIGEORGIS, L. (1996): *Real Options - Managerial Flexibility and Strategy in Resource Allocation*. 4th ed., The MIT Press, Cambridge, MA.
- TRIGEORGIS, L. and S. P. MASON (1987): Valuing Managerial Flexibility. *Midland Corporate Finance Journal* 5(1), pp. 14–21.
- TULL, D. S. (1967): The Relationship of Actual and Predicted Sales and Profits in New-Product Introductions. *Journal of Business* 40(3), pp. 233–250.
- TULL, D. S. and H. C. RUTEMILLER (1968): A Note on the Relationship of Actual and Predicted Sales and Profits in New-Product Introductions. *Journal of Business* 41(3), pp. 385–387.
- ULRICH, K. T. (1995): The role of product architecture in the manufacturing firm. *Research Policy* 24(3), pp. 419–440.

- ULRICH, K. T. (2001): Introduction to the Special Issue on Design and Development. *Management Science* 47(1), pp. v–vi.
- ULRICH, K. T. and D. J. ELLISON (1999): Holistic Customer Requirements and the Design-Select Decision. *Management Science* 45(5), pp. 641–658.
- ULRICH, K. T. and S. D. EPPINGER (2004): *Product Design and Development*. 3rd ed., McGraw-Hill/Irwin, New York.
- UPTON, D. M. (1995): Flexibility as process mobility: The Management of plant capabilities for quick response manufacturing. *Journal of Operations Management* 12(3/4), pp. 205–224.
- URBAN, G. I. and E. VON HIPPEL (1988): Lead User Analyses for the Development of New Industrial Products. *Management Science* 34(5), pp. 569–582.
- VAN MIEGHEM, J. A. (1998): Investment strategies for flexible resources. *Management Science* 44(8), pp. 1071–1078.
- VEINOTT, A. F. (1965): Optimal Policy for a Multi-Product, Dynamic, Nonstationary Inventory Problem. *Management Science* 12(3), pp. 206–222.
- WALDMANN, K.-H. (1979): Numerical aspects in Bayesian inventory control. *Zeitschrift für Operations Research* 23, pp. 49–60.
- WALL, M. B., K. T. ULRICH, and W. C. FLOWERS (1992): Evaluating prototyping technologies for product design. *Research in Engineering Design* 3(3), pp. 163–177.
- WIND, J. and V. MAHAJAN (1997): Issues and Opportunities in New Product Development: An Introduction to the Special Issue. *Journal of Marketing Research* 34(1), pp. 1–12.
- WITT, P. (2003): Die Bedeutung des Realloptionsansatzes für Gründungsunternehmen. In: U. HOMMEL, M. SCHOLICH, and P. BAECKER (eds.), *Reale Optionen*, Springer, Berlin, pp. 121–141.
- ZAHAY, D., A. GRIFFIN, and E. FREDERICKS (2004): Sources, uses, and forms of data in the new product development process. *Industrial Marketing Management* 33(7), pp. 658–666.
- ZANGWILL, W. I. (1992): Concurrent Engineering: Concepts and Implementation. *IEEE Engineering Management Review* 20(4), pp. 40–52.

---

# Index

- backward recursion, 46, 50, 80
- Bayesian updating, 21
  - basic idea, 19
  - Bayes' theorem, 51
  - conjugate relationship, 21, 24, 53, 63, 73
  - frequentists, 21
  - in NPD projects, 15
  - in R&D models, 24
  - in real options models, 37, 77
  - in SCM models, 20, 22
  - likelihood, 51, 53, 56
  - mean and variance update, 66, 74, 102, 130
  - mean update, 54, 59, 97, 127
  - posterior distribution, 51, 52, 74
  - prior distribution, 51, 73
  - sample, 51, 56, 73, 124
  - signal, 51, 124
  - sufficient statistic, 52, 56
  - updating point in time, 78
  - variance update, 61, 65, 100, 128
- concurrent engineering, 13, 15
- conjoint analysis, 16
- cost
  - continuation, 44, 49, 120
  - improvement, 44, 49, 81, 120
  - investment, 44, 120
  - updating, 78, 81, 133, 150
- decision theory, 3, 18
- dynamic programming, 46, 50, 80, 82, 126
- financial options
  - American option, 29
  - Black-Scholes pricing model, 32
  - Brownian motion, 33
  - call option, 29, 32
  - definition, 29
  - European option, 29
  - put option, 29
  - valuation, 32
  - variables, 30
- forecasting, 17
- information updating, *see* Bayesian updating
- lead users, 16, 161
- model characteristics
  - effect of cost change, 92, 107, 142
  - effect of mean and variance update, 130
  - effect of mean update, 127
  - effect of variance update, 128
  - expected project value, 106, 137, 139, 148, 152
  - expected value of information, 111, 112, 137, 147
  - optimal managerial policy, 91, 137, 140

- optimal updating point in time, 109, 147, 151
- posterior project value, 95, 132
- project value, 122, 127, 128, 130, 139
- value of information, 104, 134
- model formulation
  - basic model, 41
  - basic value function, 50
  - decision problem, 82
  - expected project value function, 80
  - expected value of information, 84
  - information updating model, 77, 86
  - managerial options, 43, 48
  - managerial policy, 44, 48
  - market payoff, 45, 49
  - market uncertainty, 45, 49
  - multidimensional basic model, 47
  - optimal updating point in time, 85
  - performance variability, 42, 47
  - posterior project value function, 80
  - prior managerial policy, 83
  - project value function, 46
  - technical uncertainty, 42, 47
  - updating point in time, 112
  - value of information, 83
- Monte Carlo simulation, 21, 28, 37
- net present value, 27, 47, 122
- new product development, 1, 10
  - decision problem, 4
  - failure rate, 2
  - process, 10, 119
  - uncertainties, 2, 12, 18, 42
- quality function deployment, 16
- R&D, 1, 10, 24, 35, 41
- real options
  - contingent claims analysis, 33, 34
  - decision tree, 33–35, 44
  - definition, 30
  - in operations management, 34
  - in R&D, 35, 41
  - integration of Bayesian updating, 37, 77
  - risk-adjusted discount rate, 34
  - risk-free discount rate, 44, 122
  - types, 30
  - valuation, 33
  - variables, 30
- scenario analysis, 28
- selectionism, 14
- sensitivity analysis, 27
- supply chain management, 3
  - bullwhip effect, 19
  - newsboy model, 23
  - Quick Response, 4, 22
- trial and error learning, 14