Overview

Before bringing a new product to market it is necessary to perform a significant amount of testing to determine whether the product is poised to be a “winner” or a “loser.” Traditionally individual and aggregate preferences have been measured using surveys, focus groups, concept tests and conjoint studies. However, these methods can be biased, costly and time-consuming to conduct, particularly when evaluating large numbers of concepts. Through their research, Dahan, Lo, Poggio, Chan and Kim seek to develop an alternative method for efficiently measuring preferences and more accurately predicting new product success based on the efficiency and incentive-compatibility of security trading markets.

Using the Securities Trading of Concepts (STOC) method, “traders” are brought together in virtual stock markets using simple Internet-based technology. Virtual securities are traded, each associated with an underlying product or service concept. Prior to trading, traders are introduced to each concept through media-rich representations. The results indicate that predictions of winning and losing concepts increase in accuracy when participants trade based on real-time market information than when they are asked simply to identify their individual preferences (through surveys).

Applications of STOC Model

As an example of the potential the STOC method offers to new product development, Dahan presented the results of experiments conducted using the STOC method on three different product concepts.

The first two experiments were conducted using bicycle pumps and crossover vehicles. In each experiment participants were presented with detailed information about the product concept (nine bicycle pumps and eight crossover vehicles), including pictures, price, brand name, and a rated list of attributes. Securities were set up representing each of the different products and participants were given cash and an equal number of shares of the securities to trade. The objective of the exercise was to maximize the value of one’s portfolio by market close (15 minutes). When later compared to actual sales data, the results indicated that the participants had consistently and accurately picked the top winners and losers within the category several months before the bike pumps or vehicles had even hit the market.

The third experiment was conducted using a laptop bag, which was offered with different bundles of features. Initially participants were presented with eight different versions of the bag, defined by a picture and a list of 10 attributes. However, the results of this exercise showed little correlation, suggesting that participants may have had difficulty differentiating between a range of
product concepts that were too similar. The exercise was then revised so that instead of focusing on entire products, participants were asked to trade individual features (such as color, size, PDA holder, flap, cell phone holder, etc.). When results were compared to actual purchase data, the results determined that participants had accurately predicted what their peers’ preferences for individual product features would be.

Future Applications

The experimental data suggests that the STOC method is extremely effective at identifying the top winning and losing product concepts, suggesting great potential for new product development purposes, particularly in capital-intensive industries. In addition to quickly selecting out winning and losing concepts, the STOC method can be used to determine which individual features of a particular product are driving its success or its failure.

The STOC method may be ready for commercialization within two years.

About the Researchers

Ely Dahan is an Assistant Professor of Management Science in the Marketing group of MIT’s Sloan School of Management. He teaches courses on New Product Development and Marketing High Technology Products. His research focuses on Internet-based market research methods, mathematical models of parallel and sequential prototyping, the economics of cost reduction during product design, and the tradeoffs involved in mass customization. Prior to returning to academia, Dahan worked as a national product manager for W.R. Grace & Company and NEC Information Systems, and he founded and served as CEO of a computer networking company in Maryland until the firm was acquired in 1993.

Andrew W. Lo is the Harris & Harris Group Professor of Finance at the MIT Sloan School of Management and the director of MIT’s Laboratory for Financial Engineering. His research interests include the empirical validation and implementation of financial asset pricing models; the pricing of options and other derivative securities; financial engineering and risk management; trading technology and market microstructure; statistics, econometrics, and bond returns; and, most recently, evolutionary and neurobiological models of individual risk preferences. His awards include the Alfred P. Sloan Foundation Fellowship, the Paul A. Samuelson Award, the American Association for Individual Investors Award, the Graham and Dodd Award, the 2001 IAFE-SunGard Financial Engineer of the Year award, the awards for teaching excellence from both Wharton and MIT. Professor Lo is currently a governor of the Boston Stock Exchange, a research associate of the National Bureau of Economic Research, a member of the NASD’s Economic Advisory Board, and founder and chief scientific officer of AlphaSimplex Group, LLC, a quantitative investment management company based in Cambridge, Massachusetts.

Tomaso Poggio is the Uncas and Helen Whitaker Professor in the Department of Brain and Cognitive Sciences at MIT, where he directs research in machine learning, computer vision and neuroscience at the MIT Artificial Intelligence Laboratory and at the MIT Center for Biological and Computational Learning. Professor Poggio is well known for his work on the visual system of the fly, nonlinear systems of theory, stereo vision and for introducing regularization theory in computer vision. Poggio and his group have spent the past ten years developing a theory of networks for learning in the framework of multivariate function approximation and applying them to several different domains. He is a former Corporate Fellow of Thinking Machines Corporation, and he has been involved in several companies in the areas of computer graphics, computer vision, computer networks, financial engineering and bioinformatics.

Nicholas Chan and Adlar Jeewook Kim are Ph.D. students in Computer Science at MIT.