

## Management Insights

### **Past Success and Creativity over Time: A Study of Inventors in the Hard Disk Drive Industry**

Pino G. Audia, Jack A. Goncalo

R&D managers interested in increasing the creative output of their departments should be aware that successful inventors could become less creative over time. In this study, we find that inventors who have experienced success in their efforts to patent their inventions continue to generate new patents, but over time these patents tend to be less divergent from their previous work. This implies that allocating more resources to the most prolific inventors may increase the productivity of their department, but it may diminish the extent to which their creative output reflects the exploration of new areas of research. The negative effects of success on creativity can be managed by encouraging inventors to collaborate with one another and by making “exploration” an explicit and desirable organizational goal.

### **Vicarious Learning in New Product Introductions in the Early Years of a Converging Market**

Raji Srinivasan, Pamela Haunschild, Rajdeep Grewal

Technological developments are combining distinct technologies to create converging markets, in which, firms from different origin industries compete against each other for the first time. The high levels of uncertainty in such settings present an environment ideal for learning from other firms (i.e., vicarious learning). In this paper, we study vicarious learning in new product introductions in the converging digital camera market, which combines computer, consumer electronics, and photography technologies. Our empirical results indicate that vicarious learning affects firms’ innovative outputs in converging markets, and that such learning depends on both characteristics of firms and products. For example, firms introduce more technology-driven products (with advanced features and functionality) in response to technology-driven products of similarly sized firms, but fewer such products in response to technology-driven products of successful firms. Firms from a given origin industry (e.g., computer) introduce more mass-market products (low-priced products with limited functionality) in response to technology-driven products of firms from outside their origin industry (e.g., consumer electronics or photography), but fewer such products in response to mass-market products of

these firms. Our insights may help managers better understand their own product introductions, and those of competitors, in uncertain converging markets. The result, we hope, will be more effective product strategies.

### **Stable Farsighted Coalitions in Competitive Markets**

Mahesh Nagarajan, Greys Sošić

Senior management in firms often face the issue of strategic alliance formation with other firms in the marketplace. Such alliances span numerous industries, such as raw materials, commodities, or components in assembly systems, and often take place between competitors who sell similar or substitutable products. One example is the formation of cooperatives that make agreements on process, capacity, and inventory levels. In this paper, we provide some guidelines on operational factors that affect such alliance structures. In doing this, we lay emphasis on farsighted stability, a natural notion of stability that takes into account that decision makers are not myopic and contemplate future ramifications of their current actions. Our analysis, using this concept, provides insight into the type of alliances that are likely to emerge in a competitive market and the sensitivity of these outcomes to the degree of competition (i.e., substitutability), the variability of the demand, and the magnitude of inventory-related costs. This insight is useful to firms in a market contemplating strategic alliances, as well as to new entrants to the market for whom our analysis provides guidelines on whether they should enter and stay alone or join an existing alliance.

### **Optimal Advertising and Promotion Budgets in Dynamic Markets with Brand Equity as a Mediating Variable**

S. Sriram, Manohar U. Kalwani

Brand managers in packaged-goods firms often increase sales promotion spending to meet short-term sales and market share objectives. There is growing evidence, however, that sales promotions have an adverse effect on a brand’s equity and hence, its future profitability. To examine this phenomenon, we develop and estimate a state-space model and determine the optimal levels of advertising and promotion budgets while taking into account their impact on brand equity. We use store-level scanner data in

the orange juice category that includes two major brands—Tropicana and Minute Maid. Our results reveal that the actual promotion levels for both brands are higher than the optimal budgets for the long term. This suggests that it may be profitable for both brands to reduce their promotion levels. Further, we find that although the long-term promotional spending levels are higher for the smaller brand (Minute Maid), it is the market leader (Tropicana) which spends more on sales promotions. Furthermore, we find that the long-term optimal advertising levels are higher for the brand with higher brand equity and a higher responsiveness to advertising (Tropicana). Finally, the long-term advertising levels are lower than the actual advertising expenditures for both brands. This implies that even when we consider the long-term effects of advertising, both brands are overspending on advertising.

### **Operations Systems with Discretionary Task Completion**

Wallace J. Hopp, Seyed M. R. Iravani, Gigi Y. Yuen

Although the U.S. economy has steadily shifted toward “white-collar” service and professional work in recent years, most operations management research has been directed toward traditional “blue-collar” production work. Because there are key differences between the two types of work, the principles used to achieve the lean revolution in manufacturing cannot all be extended to professional and service systems. In this paper, we investigate one common difference between white- and blue-collar work systems, the degree of task discretion. While many blue-collar tasks have well specified completion criteria, many white-collar tasks do not. For instance, it is usually up to an engineer to decide when the solution to a complex problem is “good enough.” The additional decision variable present in systems with discretionary task completion acts like a fourth variability buffer (in addition to capacity, inventory, and time) and qualitatively alters the behavior of these systems relative to traditional production work systems. In particular, we show that in systems with discretionary task completion, (i) adding capacity may actually increase congestion, and (ii) input task variability in service time can improve system performance. From a management perspective, these differences offer a different dimension for improving performance and imply that improvement strategies borrowed from lean practices may have unintended consequences in some types of white-collar work systems.

### **Shipment Consolidation: Who Pays For It and How Much?**

Moshe Dror, Bruce C. Hartman

One way of saving money in a supply chain is to consolidate orders for different types of items. But

this raises the problem of how to allocate the delivery costs fairly among the various items. In environments where ABC (activity-based cost) accounting is used, item managers are understandably concerned that they pay a fair portion of the total cost. In this paper, we derive a consolidation and cost allocation policy for the case where economic-order quantity (EOQ) inventory policies are used for the item types. We show that whenever it pays to consolidate several item types, there is also a fair way to share the costs, and when it is cheaper to order them separately, there is no fair allocation possible. We also describe the delivery cost structure that makes consolidation attractive. These results can help logistics managers reduce delivery costs and cost accountants allocate the resulting costs fairly.

### **The Economics of Remanufacturing Under Limited Component Durability and Finite Product Life Cycles**

Roland Geyer, Luk N. Van Wassenhove, Atalay Atasu

Remanufacturing can be an interesting business proposition if the cost of producing a new product exceeds the cost of remanufacturing a used one and if there is a market for the remanufactured product. But remanufacturing also requires durability, access to used products in the market, and remarketing before the end of the product’s life cycle in order to be economically viable. It makes no sense to invest heavily in the design of durable products if consumers do not return their used products, or do so very late in the life cycle. While this is intuitively obvious, no one has studied the complex interaction between product durability, collection rate, and life cycle, all of which can be controlled by a company to some extent. In this paper, we present simple analytical models to align durability, collection rate, and return profiles over the product life cycle so as to maximize cost savings from remanufacturing in the case of perfectly substitutable products. The resulting formulas can support calculations in specific industrial cases, but also provide insights into practical remanufacturing system design rules to guide product durability choices when collection rates and return profiles can be estimated.

### **Minimizing Information Loss and Preserving Privacy**

Syam Menon, Sumit Sarkar

Firms often share point-of-sale data with their business partners so they can identify and exploit underlying patterns of purchasing behavior for mutual benefit. However, sharing these data could result in the disclosure of relationships that are of strategic relevance to the owner of the data. It is therefore necessary to hide sensitive relationships prior to sharing. In

the context of transactional data, these sensitive relationships often exist in the form of frequently occurring itemsets (subsets of items in the database). In this paper, we present an effective approach for retaining as many nonsensitive itemsets as possible, while hiding the sensitive ones, so that the data being shared remains as rich in information content as possible. This will ensure that the firms sharing the data can extract the maximum benefit from them without the risk of revealing confidential information.

### **A Good Sign for Multivariate Risk Taking**

Louis Eeckhoudt, Béatrice Rey, Harris Schlesinger

People are always managing the risks in their lives, whether they are related to safety, wealth, health, or all three. Companies are very active in helping their employees to manage these risks through costly workplace safeguards, pension plans, and health plans. Yet, most analyses of decision making involving risk focus on one of these dimensions at a time—what is the optimal health benefit, what is the optimal pension plan? But these risks are heavily inter-related. If you have a workplace accident, you will need health care and may lose some income. If you lose money, you may not be able to afford good health care. In this paper, we consider the effect of such interdependencies. We provide some simple tests that can show when, for a given person, they may be significant enough to affect optimal choices, and we describe qualitatively how the dependency will shift the solution. This paper can be of help to companies who are designing pension and health plans for employees; for example, an employee whose health status changes might be advised to shift the portfolio allocation in her pension.

### **Equivalent Information for Multiobjective Interactive Procedures**

Mariano Luque, Rafael Caballero, Julian Molina, Francisco Ruiz

Decision making in managerial environments is becoming a very difficult task due to the increasing complexity of the problems. At the same time, advances in information technology has made available large amounts of data. Multiobjective programming and interactive methods, in particular, are becoming popular within the decision making environment, because of their ability to gradually incorporate the decision maker's preferences into the model. However, the success of the method is critically dependent on the manner of asking for this information. In this paper, we investigate equivalence relations between different kinds of information, in order to make it easier for the decision maker to supply the required data. As such, this research provides the

basis for an integrated interactive support tool for managerial decision problems.

### **Mean-Variance-Skewness Portfolio Performance Gauging: A General Shortage Function and Duale Approach**

Walter Briec, Kristiaan Kerstens, Octave Jokung

The Markowitz approach to portfolio selection proceeds in two stages. First, a mean-variance portfolio frontier is determined by minimizing the portfolio variance for a given expected return. Second, given knowledge of an investor's preferences, an optimal portfolio is selected among the points on the mean-variance portfolio frontier. Finding a way to include information on additional moments to improve the approximation of expected utility is an open problem in portfolio theory. For example, it is widely accepted that investors would prefer a high-positive skewness for their portfolio, in addition to a high return and a low variance. This paper proposes a nonparametric efficiency measurement framework for the static portfolio selection problem in mean-variance-skewness space by defining a function that, starting from an arbitrary initial portfolio, is capable of looking for simultaneous increases in return and skewness and decreases in variance. A key result is that this new approach guarantees the achievement of global optima for the resulting portfolio on the unknown mean-variance-skewness portfolio frontier. Another advantage is that this function can be linked to an investor's utility function defined over the mean-variance-skewness space. Assuming one can define preference parameters reflecting the investor's preferences for these three measures, this second stage allows choosing the optimal portfolio among the mean-variance-skewness optimal portfolios resulting from the first stage. Unfortunately, the portfolios resulting from this second stage yield only locally optimal solutions. From a practitioner's point of view, it is important to stress that this second stage is not indispensable. Since little is known about some of the risk parameters, portfolio managers could eventually content themselves with just trying to find improvements in terms of mean, variance, and skewness using the first stage.

### **Research Note: The Role of Production Lead Time and Demand Uncertainty in Marketing Durable Goods**

Preyas S. Desai, Oded Koenigsberg, Devavrat Purohit

Most manufacturers have to make production decisions before they know the demand for their products. As a result, they frequently end up holding inventory or facing acute shortages. For manufacturers of durable goods, the challenge of managing production lead times and demand uncertainty is made

even more complex because of competition from used goods in the resale market. Our analysis shows that it is optimal for a durable goods manufacturer to incorporate two opposing effects of product durability. First, as the product becomes more durable, it creates a better value for consumers, thus increasing current demand for the product and providing incentive for the firm to carry fewer units in inventory. Second, as the product becomes more durable, future competition between new and used units becomes more intense, pressuring the firm to limit the product's current sales and carry more units in inventory. This suggests that if managers market products with varying levels of durability, they should carry fewer inventories and be more aggressive in sales for lower durable products. Our results also suggest that firms that lease their products need to carry higher levels of inventory than firms that sell their products.

**Research Note: Competitive Bundling and Counterbundling with Generalist and Specialist Firms**  
[Bikram Ghosh](#), [Subramanian Balachander](#)

Bundling is the marketing practice of selling two or more products or services in a package. In this paper,

we consider a bundling competition between a multi-product generalist firm (e.g., a cable company) and two single-product specialist firms (e.g., phone and satellite companies). Specifically, we analyze a model in which a generalist firm offers a product in each of two categories and competes with two specialist firms, each of which offers a single product in one of the two categories. We assume the products in one category are highly substitutable with each other, while the level of substitutability of competing products in the second category is varied in the analysis. Using a game theoretic analysis we arrive at the following insights: (1) The generalist firm can increase profit and market share by bundling its products when the specialist firms do not form a competitive alliance. (2) Specialist firms should form an alliance and counterbundle only when the level of substitutability in the second category is moderate. (3) When both competitors bundle, profits are higher than if both were selling unbundled products. (4) However, when the level of substitutability in the second category is high, counterbundling by the specialist firms escalates price competition to the point that retaining customers through bundling is not profitable.