PRODUCTION AND OPERATIONS MANAGEMENT

POMS

Vol. 18, No. 1, January–February 2009, pp. vii–viii
ISSN 1059-1478 | EISSN 1937-5956 | 09 | 1801 | 0vii

DOI 10.3401/poms.1080.01042


# Management Insights

**Managing White Collar Work: An Operations-Oriented Survey**
Wallace J. Hopp, Seyed M. R. Iravani, Fang Liu

In developed nations, traditional ''blue collar'' jobs are steadily being automated or outsourced, resulting in a growing fraction of jobs in the service and professional sectors. While productivity of this ''white collar'' work is economically vital, the field of operations management (OM) has much more to say about the manual tasks and physical material flows that characterize blue collar work than about the creative tasks and knowledge flows inherent in white collar work. To contribute to productivity improvements in the service and professional sectors analogous to those achieved by lean production in the manufacturing sector, OM scholars need to incorporate insights from other disciplines, such as economics, sociology, organizational behavior, marketing and other fields. In this paper, we identify key issues peculiar to white collar work, and contrast these with existing streams of research from various fields. The gaps we observe point toward promising research opportunities in performance measurement, integration of material and information flows, and incorporation of more realistic human behaviors into operations models. Attention to these could spark a productivity revolution in environments (e.g., consulting, law, education, R&D) not traditionally thought of as targets for OM methods.

**Workload Balancing Through Recurrent Subcontracting**
Bogdan C. Bichescu, Michael J. Fry, George G. Polak

Scaling capacity in response to short-term variations in customer demand has been a long-time challenge for companies. Ideally, businesses would favor a level workload that affords a constant utilization of their fixed capacity. Current practices dictate that companies buffer against these variations by holding inventory, maintaining excess capacity, or utilizing a flexible work force. Such strategies are not only expensive but are also infeasible in certain industries, such as electricity generation, where holding inventory is often technically challenging or cost prohibitive. Recurrent subcontracts that feature periodic exchanges of services and cash flows, whereby a company both outsources and insources work, can be effective alternatives to traditional buffering strategies. The authors propose novel methods to balance workload by building a portfolio of recurrent insourcing and outsourcing contracts. These methods provide practical and effective means of achieving a level workload profile over a given period of time through recurrent contracting.

**Maximizing Throughput of Bucket Brigades on Discrete Work Stations**
Yun Fong Lim, Kum Khiong Yang

Managers often face a challenge of allocating their workforce in an assembly line that has fewer workers than work stations. To maximize throughput of the line managers need to effectively coordinate the workers so that their idle time is minimized. One way to coordinate the workers is to form a bucket brigade. The throughput of a bucket brigade on discrete work stations may be compromised due to blocking even if workers are sequenced from slowest to fastest. For a given work distribution on the stations, the authors find policies that maximize the throughput. When workers have very different production rates, fully cross-training the workers and sequencing them from slowest to fastest is almost always the best policy. This policy outperforms other policies for most work distributions except for some cases in which limiting the work zones of workers produces higher throughput. In environments where the work can be adjusted across stations, the authors identify conditions for a line to prevent blocking. This work has potential implications for practicing managers on cross-training and sequencing the workers as well as adjusting work content on discrete work stations.

**Conditional Monte Carlo Gradient Estimation in Economic Design of Control Limits**
Michael C. Fu, Shreevardhan Lele, Thomas W.M. Vossen

A key ingredient of total quality management is statistical process control. Although control charts are very commonly utilized, most implementations of control charts are purely statistical in nature, and do

Production and Operations Management 18(1), pp. vii–viii, © 2009 Production and Operations Management Society

not incorporate critical economic considerations such as operational costs and quality costs associated with production that depend on the process state. On the other hand, most work up to now that has dealt with the economic design of control charts do not have the modeling flexibility that Monte Carlo simulation allows. A new method can be used to efficiently design the control limits of many different types of control charts in a very general modeling framework.

**Cooperative Advertising and Pricing in a Dynamic Stochastic Supply Chain: Feedback Stackelberg Strategies**
Xiuli He, Ashutosh Prasad, Suresh P. Sethi

Cooperative (co-op) advertising is used in supply chains as an incentive by the manufacturer to influence retailer behavior. In co-op advertising programs, the manufacturer contributes a percentage of the retailer's advertising expenditure to increase the sales of its product. The contributed percentage is called the *participation rate*. Co-op advertising programs can be a significant expense for the manufacture. About 25–40% of local advertisements are cooperatively funded with the participation rates ranging from 50% to 100%.

Advertising has dynamic effects on the sales. For the manager, it is also important to understand various costs, advertising effectiveness, uncertainty and other market and firm specific parameters will affect the price and advertising decisions. With co-op advertising, the decentralized channel, as compared with the integrated channel, has higher than optimal price and lower than optimal advertising. A co-op advertising and revenue sharing contract allows the decentralized channel to achieve the optimal outcome. Co-op advertising programs should only be offered when the manufacturer's channel power is higher than that of the retailer.

**Measuring the Impact of Increased Product Substitution on Pricing and Capacity Decisions under Linear Demand Models**
Betul Lus, Ana Muriel

In the current environment of increased competition and product proliferation, product-mix flexibility emerges as a necessary strategy to balance supply and demand, and provide adequate market responsiveness. The automotive industry provides poignant examples of the benefits of flexibility and the perils of the lack thereof. There is, however, little and conflicting information on how product substitution, the ability to shift consumer preferences from one product to another through pricing, affects the optimal levels of flexibility to invest in and its benefits. Product substitution is pervasive in many industries and should thus be an important factor for many firms not only in planning their product lines but also in designing their (flexible) production networks. Under realistic assumptions on the correlation between the price/demand potentials of the products, investing in manufacturing flexibility becomes increasingly less attractive for closer substitutes. The optimal expected prices and production quantities do not depend on the cost of the flexible capacity; manufacturing flexibility simply allows the firm to achieve those expected values with lower capacity, while leading to higher expected profits.

**Life-Time Buy Decisions with Multiple Obsolete Parts**
James R. Bradley, Héctor H. Guerrero

Parts often become obsolete before the end of the lives of the products that require them. This is particularly common with electronic products. Many responses to part obsolescence are possible including redesigning a product so that it no longer requires the obsolete part. Redesigning a product, however, can be very expensive, which motivates manufacturers to find what are perceived to be less costly tactics to mitigate part obsolescence. Perhaps the most common method is to procure a ''life-time buy'' of an obsolete part in a quantity sufficient to last for the remaining life of a product. Deciding how many parts to buy, however, can be a very complex problem given the changing demand for the product over its life and that many parts that are used in the product might become obsolete. Two simple methods can compute an economical order quantity. Even when optimal life-time buy quantities are used, this tactic can be much more costly than managers may perceive. This may motivate managers to rethink their assumption of how expensive redesigning a product is relative to other alternatives including life-time buys.