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Management Insights

Task Design, Team Context, and Psychological Safety: An Empirical Analysis of R&D Projects in High Technology Organizations
Aravind Chandrasekaran, Anant Mishra

Aravind Chandrasekaran and Anant Mishra investigate the challenges involved in managing R&D project teams in high technology organizations. Conventional wisdom suggests that high levels of project decision making autonomy benefits these teams. The authors challenge this conventional wisdom especially when R&D project teams work on projects with dual goals of exploration and exploitation. Exploration involves introducing new products, entering new technology fields or opening up new markets; these goals have stochastic outcomes but can result in higher market returns. In contrast, exploitation involves reducing development costs and development times or improving quality; these goals have deterministic outcomes and are usually associated with lower market returns. Using data collected from multiple informants across 110 R&D projects, the authors find that higher levels of decision making autonomy decreases psychological safety – a shared belief that the team is safer for interpersonal risk taking – in R&D project teams when exploration goals are emphasized over exploitation goals. This in turn can increase team turnover and reduce R&D project performance. The authors recommend aligning project level metrics with the overall organizational metrics as a potential solution for increasing psychological safety in high technology R&D project teams.

Competition and Coordination in Online Marketplaces
Jennifer K. Ryan, Daewon Sun, Xuying Zhao

Online market places, such as those operated by Amazon, have seen rapid growth in recent years. These marketplaces provide the service of matching buyers with sellers, while control of the good is left to the seller. In some cases, the firm that owns and manages the marketplace system will also sell competing products through the marketplace system, e.g., Amazon may sell the same products as its merchants. Ryan, Sun, and Zhao study such a system and find that if the marketplace system is viewed as being more secure or as providing better service than the merchant, and thus consumers have a clear preference for engaging in transactions with the marketplace firm, then the marketplace firm will generally prefer to compete directly with the merchant's own online store, rather than allowing the merchant to sell goods through the marketplace system. On the other hand, when consumers do not have a strong preference for purchasing from the marketplace system, and when the merchant's unit cost is low, the marketplace firm will generally choose not to compete directly with the merchant, and instead will encourage the merchant to participate in the marketplace system, thus achieving coordination and maximizing the total system profit.

Coalition Formation and Cost Allocation for Joint Replenishment System
Adel Elomri, Asma Ghaffari, Zied Jemai, Yves Dallery

Strategic alliances play a crucial role in supply chains, however too many alliances fail to meet their partners' goals. While the reasons behind alliance failures are complex and vary according to the type of alliance and industry, most failures result from "unfair" allocations of the alliance's benefit among the cooperating agents. For instance, getting the partners agree on how to divide the surplus generated by the alliance is a core element in building successful alliances. Adel Elomri, Asma Ghaffari, Zied Jemai, and Yves Dallery propose a framework for strategic alliance building and profit allocation in joint replenishment systems. In particular, they consider inventory situations where a set of independent and freely interacting firms can take advantage from ordering their items jointly (i.e., shipment consolidation) instead of working individually. They develop incentives on identifying appealing alliances for each firm and shows that the proportional allocation guarantee the stability of these alliances: that is, under this easy to implement allocation mechanism each firm would feel that acting as an alliance is worthwhile for its own sake.

A Multi-Supplier Sourcing Problem with a Preference Ordering of Suppliers
Dorothée Honhon, Vishal Gaur, Sridhar Seshadri

Dorothée Honhon, Vishal Gaur, and Sridhar Seshadri present a method by which a firm can integrate the

cost competitiveness of alternative suppliers and their historical performance in designing an effective sourcing strategy. Historical performance is measured using supplier scorecards, and yields a preference ranking of suppliers. The firm then decides which suppliers to purchase from and in what quantities in order to maximize its total expected profit subject to the preference ordering constraint. The authors show that the optimal sourcing strategy has a portfolio structure, and achieves a substantial profit gain compared to sourcing from a unique supplier. Their method applies to component sourcing problems in manufacturing, merchandising problems in retailing, and capacity reservation problems in services.

Extended Producer Responsibility for E-Waste: Individual or Collective Producer Responsibility?
Atalay Atasu, Ravi Subramanian

Motivated by manufacturers' concerns regarding the fairness of recovery cost sharing under collective product take-back systems, Atalay Atasu and Ravi Subramanian analytically investigate manufacturers' design for product recovery (DfR) choices, profits, and consumer surplus under individual and collective producer responsibility (IPR and CPR) models of product take-back. Considering a competitive setting with distinct brand positions, heterogeneous customers, and DfR choices influencing variable production costs, the paper models the superior recovery options under IPR (e.g., reuse or remanufacturing) and scale economies and the absence of brand separation costs under CPR. The main findings include the following: (i) Producers find lower incentives for DfR under CPR than under IPR because returns on private DfR investments are not fully realized under CPR due to the sharing of product recovery costs; (ii) The identity of free-riders under CPR depends on whether the "averaging" of recovery costs is endogenous (based on actual sales or waste volumes) or exogenous (based on presumed impacts of manufacturers on the cost of product recovery). Notably, even high-end manufacturers who enjoy better brand positions may have incentives to free-ride; and (iii) CPR may result in a higher consumer surplus overall than IPR because consumers of a free-riding manufacturer's product may see low prices.

Analysis of Travel Times and CO_2 Emissions in Time-Dependent Vehicle Routing
O. Jabali, T. Van Woensel, A.G. de Kok

Assigning and sequencing vehicles to service a predetermined set of clients is a common distribution problem. Accounting for traffic congestion, by means of time-dependent travel times, is necessary for accurately assessing travel times between locations. Jabali, Van Woensel, and de Kok study this distribution problem while accounting for traffic congestion, fuel consumption, and CO2 emissions costs. Specifically, the impact of limiting the speed of heavy-duty vehicles on these costs is assessed. The CO2 emissions per kilometer as a function of speed are minimized at a unique speed. However, in a time-dependent environment this speed could be suboptimal in terms of total emissions. This occurs if vehicles drive faster and are subsequently able to avoid running into congestion periods, where they incur high emissions. As fuel consumption is correlated with CO2 emissions, the authors show that reducing emissions leads to reducing costs. For a number of experimental settings limiting vehicle speed to a value that is lower than most speed limits was desired from a total cost perspective. This stems from the trade-off between fuel and travel time costs.

Impact of Reseller's Forecasting Accuracy on Channel Member Performance
Ying-Ju Chen, Wenqiang Xiao

Ying-Ju Chen and Wenqiang Xiao consider a risk-neutral manufacturer selling a product through a risk-neutral reseller, who then relies on its own risk-averse salesperson to sell to the end market. The reseller has superior capability in demand forecasting relative to the manufacturer. The authors explore the main tradeoffs between the risk-reduction effect and the information-asymmetry-aggravation effect of the improved forecasting accuracy. The authors show that under the optimal wholesale price contract, both the manufacturer and the reseller are always better off as the reseller's forecasting accuracy improves. Nevertheless, under the menu of two-part tariffs, the manufacturer prefers the reseller to be either uninformed or perfectly informed about the market condition. The reseller may be hurt by improving its forecasting accuracy if its current forecasting accuracy is moderate.

Equilibrium Financing in a Distribution Channel with Capital Constraint
Bing Jing, Xiangfeng Chen, Gangshu (George) Cai

Many retailers face capital constraints when procuring goods from their upstream manufacturers. Bing Jing, Xiangfeng Chen, and Gangshu (George) Cai examine a distribution channel consisting of one manufacturer and one capital-constrained retailer. The retailer may borrow from a bank or seek trade credit from the manufacturer, provided it is to the latter's interest to lend. The authors show that the manufacturer is willing to extend and the retailer is also willing to borrow

trade credit when the former's production cost is below a certain threshold. Otherwise, the retailer has to borrow from the bank. The reason is as follows. When production cost is sufficiently low, trade credit prompts the retailer to order more than it would if it had no capital constraint, while containing the manufacturer's risk caused by the retailer's possible default. When both channel members are capital constrained, total channel profits are higher under trade credit when production cost is relatively low and are higher under bank financing otherwise. Furthermore, the manufacturer is less likely to issue trade credit as the demand uncertainty or the retailer's internal capital increases.

Gray Markets, A Product of Demand Uncertainty and Excess Inventory
Sriram Dasu, Reza Ahmadi, Scott M. Carr

Sriram Dasu, Reza Ahmadi, and Scott M. Carr consider a stochastic supply chain models in which an authorized retailer can divert unsold inventory to an unauthorized or gray market distribution channel. The practice can either benefit or harm producers, who will see additional demand but also will bear a number of potential costs and risks. The authors show that the expected quantity diverted changes with expected authorized and unauthorized demand and with margins in various channels. Looking at two managerial leverages to mitigate the effects of gray markets, buyback, and multiple replenishment, the authors show how buyback contracts could increase producer profit but prove unsatisfactory to authorized retailers. Multiple replenishments bring total quantity purchased closer to the true demand, though, benefitting the authorized retailer, and perhaps penalizing the producer. The authors also show that when a distributor intermediates between the two types of retailers, it is shown that the distributor's very presence reduces the ability of the producer to affect the gray market.