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Research Spotlights

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Prescribing Response Strategies to Manage Customer Opinions: A Stochastic Differential Equation Approach (p. 351)

Mingwen Yang, Zhiqiang (Eric) Zheng, Vijay Mookerjee

Today, firms heavily rely on online customer opinions (ratings, reviews, etc.) to manage customer review. This task usually requires responding to customer reviews, especially negative ones, to reduce or suppress further negative reviews on the same issue. That is, firms often use a selective strategy to respond (response strategy). To guide firms in the task of managing customer review, we develop a diffusion model of the evolution of ratings over time, as a function of the firm's response strategy. The model is estimated using data from China's tourism industry. Our approach is predictive: a firm can study the impact of different response strategies on customer review. It is also prescriptive: a firm can choose its goal for managing customer review (e.g., set a target for the mean rating, ensure that the ratings stay above a certain level with a high probability, etc.) and derive a response strategy that achieves this goal. The response strategy proposed in this study is flexible: its response frequency increases or decreases with the current rating level. Our model can also handle response strategies with multiple triggers, for example, the response probability can depend on both the rating and the sentiment.

Relative Privacy Valuations Under Varying Disclosure Characteristics (p. 375)

Joseph R. Buckman, Jesse C. Bockstedt, Matthew J. Hashim

We investigate changes to the value individuals place on the online disclosure of their private information in the presence of multiple privacy factors. We capture individuals' willingness-to-accept for a privacy disclosure in a series of randomized experiments that manipulate characteristics of a required privacy disclosure by altering the information context, the intended secondary use of the disclosed private information, and the requirement to disclose personally identifying information. We collect data from two populations (college students and Amazon Mechanical Turk workers) to aid with generalizability of our results. Across the experiments, we consistently observe null effects for each of the privacy factors. The results provide a unique perspective on privacy valuations by showing that results from prior research on simple privacy decisions may not translate to more realistic, complex privacy disclosure decisions that involve multiple factors. Our findings suggest that disclosing private information may be an all or nothing type of decision as opposed to an activation of individual factors proposed by prior literature as important in a multidimension private information disclosure. This study provides managerial insight into the possible evolution of online disclosure decisions, especially in settings that incorporate multiple disclosure dimensions.

Jack of All, Master of Some: Information Network and Innovation in Crowdsourcing Communities (p. 389)

Elina H. Hwang, Param Vir Singh, Linda Argote

In this paper, we examine information flow across two crowdsourcing communities and provide empirical evidence on how information obtained from a customer support crowdsourcing community can help individuals generate more novel, popular, and feasible ideas in an innovation crowdsourcing community. Our findings inform firms' decisions about whether to simultaneously host customer support and innovation crowdsourcing communities. Companies such as Dell and BestBuy simultaneously host customer support and innovation crowdsourcing communities. Yet many other companies host only innovation crowdsourcing communities. Our findings suggest that hosting both communities has benefits because a customer support community offers idea generators an opportunity to accumulate current needs information as well as to activate means information from their memory. This needs-and-means information enables idea generators to create high-quality new product/service ideas. Our findings further suggest that those firms that are already hosting two crowdsourcing communities could benefit by tracing individuals' activities more closely. By collecting data about individuals' microlevel activities

in a customer support community, companies would be able to identify those individuals who have a higher probability of creating better ideas. By mobilizing those individuals, companies can increase the quality of ideas they obtain from innovation crowdsourcing communities.

Bilateral Liability-Based Contracts in Information Security Outsourcing (p. 411)
Kai-Lung Hui, Ping Fan Ke, Yuxi Yao, Wei T. Yue

Many organizations today engage managed security service (MSS) providers to protect their information systems and digital assets. With such collaborative arrangement, the protection quality depends on the effort of both the MSS provider and the client. It is generally difficult to assign the liability to each party in the event of security breaches, which leads to undercontribution of protection efforts. This study addresses this difficult problem using liability-based contracts.Leveraging on the negligence concept from the legal profession, the authors propose two novel and practicable bilateral contracts: threshold-based liability contract and variable liability contract. Both of them are socially efficient when postbreach effort verification is feasible, and they produce more efficient outcomes than multilateral contracts when the MSS provider assumes limited liability. The threshold-based liability contract requires less postbreach auditing effort and is more resilient to auditing errors. The insights for management: Bilateral liability-based contracts can be socially efficient in the real world. MSS providers should define the remedy conditions carefully in their service-level agreement to encourage the right provision of efforts from the clients.

Selling Virtual Currency in Digital Games: Implications for Gameplay and Social Welfare (p. 430)
Hong Guo, Lin Hao, Tridas Mukhopadhyay, Daewon Sun

The sale of virtual currency has become an important revenue source in the digital gaming industry. This paper analyzes the impact of this business model on players' gaming behavior, the game provider's strategies for virtual currency price and ad level, and social welfare. Our findings have important managerial implications for the gaming industry and policy makers. We find that when the enabling-power rate of virtual currency (i.e., how much players benefit from enhanced gameplay due to virtual currency generated per unit of playing time) is stronger, players have lower incentive to purchase virtual currency. Therefore, the provider should set a lower price to avoid losing too much demand. In the meantime, the marginal benefit of playing the game increases, and thus the provider should set a higher ad level to take advantage of this boosted marginal benefit for players when the base valuation of gameplay is sufficiently low. Finally, we demonstrate that offering in-game purchases of virtual currency as a new business model benefits society as a whole. Our findings suggest that regulators of the gaming industry should be less concerned about the risk of excessive gameplay for games that sell virtual currency compared with those that do not.

Talking Up a Storm: How Backers Use Public Discourse to Exert Control in Crowdfunded Systems Development Projects (p. 447)
Rob Gleasure, Kieran Conboy, Lorraine Morgan

New models of information systems development (ISD) have emerged to accommodate distributed participation and large numbers of contributors. Crowdfunding extends distributed models by allowing members of the public to finance a project, bypassing or lessening the need for traditional investor-controllers. Backers lack most defined power relationships and control mechanisms available to traditional investor-controllers. Yet some backers still successfully assume the power to influence the projects they support. This challenges traditional notions of power and control in ISD. We thus study two famous crowdfunded cases to explore how power and control are attained in these projects. Findings show that backers do indeed collectively impose each of the same high-level control types as traditional investor-controllers, albeit the specific controls imposed may vary. Key to backers' power is their ability to construct a positive or negative public image around a project, a power for which they continuously battle among themselves. This uncovers important vulnerabilities in crowdfunding, many of which emerge when public perceptions of project failure are high. Under these conditions backers may become increasingly assertive, which paradoxically causes owners to become less compliant. This study further identifies issues with attracting large numbers of backers, as power and control dynamics become increasingly unstable.

Audit Policies under the Sentinel Effect: Deterrence-Driven Algorithms (p. 466)
Lina Bouayad, Balaji Padmanabhan, Kaushal Chari

Auditing has been commonly used in major industries, including healthcare, to curb fraudulent activity. In addition to the direct benefits of auditing, data collected in this study through interviews, a focus group, and surveys of medical practitioners and audit experts indicate that auditing has a second-order effect through which audit information diffuses in the practitioner network triggering deterrence. This second-order effect, referred to as the "sentinel effect," has been

overlooked by auditing algorithms that have traditionally focused on detection of fraudulent claims or practitioners only. We present an algorithm that supports a deterrence-driven audit approach in the presence of audits and sentinel effects. Simulation results, augmented with real practitioner data from two counties in Florida, indicate the potential of such algorithms at reducing excess costs, especially when waste and abuse are prevalent. Management insight: Savings from audits arise as a result of both the direct audit effect and the sentinel effect, which causes deterrence among people who might hear about audits. Insurance providers could therefore consider connectedness, conditional on high enough risk scores, when selecting practitioners for audit. Through the sentinel effect, large numbers of practitioners receiving the audit information are likely to improve billing behavior, ultimately maximizing deterrence from waste and abuse and reducing overall healthcare costs.

Adopting Seekers' Solution Exemplars in Crowdsourcing Ideation Contests: Antecedents and Consequences (p. 486)
Tat Koon Koh

Crowd-based ideation contests facilitate solution-seeking firms (seekers) to address their problems by soliciting ideas from external individuals (solvers). In this study, we examine how seekers' involvement—particularly in terms of the exemplars and prizes that they provide—shape the ideation process and outcomes in such contests. Although seekers' decisions about the exemplars to show and prizes to offer may be independent from one another, we show that certain aspects of these decisions jointly impact the extent to which solvers adopt seekers' exemplars in their ideas. This finding demonstrates that individual facets of seeker involvement could intertwine and have intricate effects on solvers right from the initiation of the contests. We further show that, by influencing solvers' exemplar adoption, seekers can also affect the effectiveness of the ideas. All in all, our results indicate that seekers acquire ideas not just *through* the crowd but also *with* the crowd, and they play an active role in how and what solvers ideate. Instead of simply delegating idea generation to solvers, seekers should thus share the onus of ideation and be aware of the impacts of their involvement in contests.

Effects of Sponsorship Disclosure on Perceived Integrity of Biased Recommendation Agents: Psychological Contract Violation and Knowledge-Based Trust Perspectives (p. 507)
Weiquan Wang, May Wang

Product recommendation agents (RAs) are widely employed by online merchants to facilitate consumers' decision making. Users' perceived integrity of these RAs becomes a critical trust concern when RAs apply sponsorship practices and recommend products biased toward sponsored products. Sponsorship disclosure is enforced by the U.S. Federal Trade Commission, but many technologies fail to comply probably because of their concerns on users' trust in the biased technologies. This research investigate when sponsorship disclosure is most effective in enhancing users' perceived RA integrity. A laboratory experiment revealed two major findings related to the benefits of sponsorship disclosure in enhancing users' perceived integrity of a biased RA. First, for users with high prior knowledge about the prevalence of sponsorships used by RAs in general, sponsorship disclosure can reduce users' perceived psychological contract violations of a biased RA and then increase users' perceived RA integrity. For users with limited such prior knowledge, the disclosure fails to reduce these perceived violations. Second, regardless of the level of such prior knowledge of users, sponsorship disclosure enhances users' perceived transparency of a biased RA, which, in turn, leads to perceived RA integrity.

Motivating Effective Mobile App Adoptions: Evidence from a Large-scale Randomized Field Experiment (p. 523)
Tianshu Sun, Lanfei Shi, Siva Viswanathan, Elena Zheleva

The adoption and usage of mobile devices have fundamentally altered users' experience in a multichannel world. With the rise of mobile channels, firms have designed thousands of campaigns and spent billions of dollars to motivate or even subsidize app adoptions. However, it is not clear whether and how firms can effectively increase customers' purchases through these *induced adoptions*. Using a randomized field experiment involving over 230,000 customers on a major daily deal platform, we investigate the differential impacts of offering *incentives* or *information* on customers' app adoptions and subsequent purchase behaviors. We find that the causal effect of induced app adoptions varies greatly depending on how customers are motivated. Although providing incentive encourages most adoptions, incentive-induced adoptions do not result in more purchases in the long run. In contrast, providing information leads to effective mobile adoptions that sustainably increase customers' purchases and overall profits for the firm. We further identify a complementary effect between mobile app and desktop channels for information-induced app adopters, because the app serves as a deal discovery tool for them. Finally, we find that information

works as a sorting device and attracts customers who have a greater need for the app and use it more effectively.

Storm Clouds on the Horizon? New Entry Threats and R&D Investments in the U.S. IT Industry (p. 540)
Yang Pan, Peng Huang, Anandasivam Gopal

It is well accepted that the information technology (IT) industry is highly volatile, where incumbent firms are often disrupted by startups entering their product or service markets. This creative destruction is driven by large-scale movements within the entrepreneurial ecosystem, consisting of startups, venture capitalists, and innovators. These collectively represent the threat of new entry for incumbents, leading to turbulence in the future and necessitating a strategic response. Quantifying these risks of new entry threats (NETs) has always been problematic given their probabilistic and forward-looking nature. Taking advantage of text analytics, we develop a text-based measure of NET based on the extent to which a firm's description of its product markets overlaps with business descriptions of entrepreneurial firms backed by venture capitalists. This measure is then used to investigate how IT firms respond to NET through preemptive investments in research and development (R&D). We show that incumbents actually reduce R&D spending, on average, when facing high NET, consistent with risk aversion and financial conservatism. However, firms operating in contexts where high NET is unlikely to change market structure are likely to be more aggressive with their R&D spending—these contexts include markets with winner-takes-all dynamics because of strong network effects and those where the success of R&D effort hinges on the relevant continuities with prior innovative activities.

How Does the Implementation of Enterprise Information Systems Affect a Professional's Mobility? An Empirical Study (p. 563)
Brad N. Greenwood, Kartik K. Ganju, Corey M. Angst

In this work, we examine how the implementation of enterprise systems, namely electronic health records, influences the ability of organizations to retain highly trained professional workers within the firm. Specifically, we investigate how this implementation affects the decision of physicians to continue practicing at their current hospital. Results suggest that when enterprise systems create benefits for professionals, such as reducing their workloads or preventing costly errors, their duration of practice at the organization *increases* significantly. However, when technologies are disruptive and force professionals to alter their routines, there is a pronounced exodus from the organization. Interestingly, we also find that the punitive effects of disrupting physician routines are more pronounced when physicians (i) are older, (ii) have more outside options, (iii) are specialists, and (iv) have been disrupted more in the past (as measured by number of previous IT implementations).

Efficient Computational Strategies for Dynamic Inventory Liquidation (p. 595)
Mochen Yang, Gediminas Adomavicius, Alok Gupta

We examine the dynamic inventory liquidation problem, in which a retailer liquidates a fixed number of identical items over a time period by strategically setting prices periodically according to knowledge about stochastic demand. We propose to solve the liquidation problem by deriving a deterministic representation of stochastic demand. Assuming that customer arrival and valuations follow known statistical distributions (e.g., estimated from past transaction data), the expected arrivals and expected order statistics of valuation distributions represent informative and advantageous approximations of demand. Under the deterministic demand representation, we develop a greedy heuristic for finding the optimal liquidation strategy that result in maximum total revenue. The heuristic approach is computationally highly efficient and provides optimal solutions under deterministic demand representation when customer valuation follows various typical statistical distributions. Compared with two simple and commonly used liquidation strategies (i.e., the fixed-price strategy and the fixed-quantity strategy), our heuristic yields higher liquidation revenue. Compared with sophisticated approaches that can find optimal liquidation strategies under stochastic demand (e.g., stochastic dynamic programming), our approach runs several magnitudes faster and still yields near optimal expected revenue. Therefore, the heuristic approach can serve as a useful tool for managers to make liquidation-related decisions in realistic, stochastic demand scenarios.

Forward-Looking Behavior in Mobile Data Consumption and Targeted Promotion Design: A Dynamic Structural Model (p. 616)
Lizhen Xu, Jason A. Duan, Yu (Jeffrey) Hu, Yuan Cheng, Yan Zhu

Are individual consumers forward looking in consuming mobile data volume every day, subject to monthly quota limit? If so, how can mobile carriers easily identify these forward-looking users and design profitable promotions targeting these users? We discover distinct temporal usage patterns that can distinguish forward-looking users from myopic ones. An empirical test is constructed to test for individual forward-looking behavior and applied to a unique data set of individual mobile data users' daily usage volume over multiple months. We find a considerable proportion of users (about 40%) are indeed forward

looking and also find empirical evidence of individual consumer myopia. Our dynamic structural model enables sophisticated counterfactual simulations incorporating various factors (e.g., consumer anticipation, plan switch) to deliver rich implications for targeted promotion design. As we find, promotions targeting only forward-looking consumers could be significantly more profitable than blanket promotions uniformly applied to all. Properly designed end-of-month promotions targeting forward-looking users could help mobile carriers fully utilize the otherwise excess network bandwidth and increase revenue at little extra cost.

Explaining Digital Piracy: A Meta-Analysis (p. 636)
Martin Eisend

Why do users engage in digital piracy? The theoretical explanations are particularistic and the empirical findings are fragmented and divergent. Managers and academics have thus had little guidance on how to explain and combat digital piracy. To help fill this gap, the present paper provides a meta-analysis that synthesizes past research and identifies the key drivers of users' engagement in digital piracy. The findings identify new measures and revise existing strategies to confront the global threat of digital piracy. Effective anti-piracy measures focus on breaking habits, reducing users' control, suppressing justifications, and changing attitudes. Breaking habits requires technical control strategies such as impeding access to pirate sites, and should be accompanied by legislative demands. Impairing the attractiveness of pirate websites while providing high quality content on legitimate channels weakens illegal users' perceived control. Enhanced features and functionality of legal products and websites that are easy accessible strengthens legal users' perceived control. While many existing anti-piracy campaigns foster positive appeals (e.g., supporting the industry), describing the risks and loss of control seem more promising. As for targeting, psychographics provide a better portrait of pirating users than demographics—they appreciate sharing, are innovative, less risk averse, less susceptible to influence, and of lower integrity. Finally, making more legal copies available to users is discouraged.

The Coevolution of Objects and Boundaries over Time: Materiality, Affordances, and Boundary Salience (p. 665)
Paul M. Leonardi, Diane E. Bailey, Casey S. Pierce

This paper examines the way that objects are used in global product development work. Specifically, the findings show how certain objects are better for training workers at new product development centers offshore centers when workers there are novices. As their skill level grows, other objects become useful for communicating knowledge and information in an expeditious manner. This research identifies which kinds of objects should be used when to build a learning organization that completes high-quality product development.

Toward a Theory of Information Systems Security Behaviors of Organizational Employees: A Dialectical Process Perspective (p. 687)
Mari Karjalainen, Suprateek Sarker, Mikko Siponen

Understanding why employees do or do not comply with information systems security (ISS) procedures is an imperative in today's organizations whose futures often depend on how well they protect and harness information assets. We use a predominantly inductive approach to develop a theoretical understanding of how employees' reasons for engaging to ISS behaviors (ISSBs) change over time, using ideas from dialectics as our scaffolding. Our dialectical view of this process suggests that explanations for engaging in different ISSBs change over time as individuals seek to balance contradictory demands. Furthermore, our view suggests that new experiences and external events initiate a process of reevaluating tensions that can in turn lead to behavioral changes. Based on our observations and interpretation, we conclude that it is beneficial for ISS practitioners not only to be aware of factors that seem to promote compliance with ISSPs, but also to pay attention to the importance of opposing values and pressures, triggers, and ways to resolve the existing tensions related to an individual's ISSBs. This will likely enable awareness about the dilemmas that individuals confront in ISS-related situations and potentially contribute to the design of better controls and procedures for ensuring compliant ISSBs.