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Leveraging User-Generated Content for Product Promotion: The Effects of Firm-Highlighted Reviews (p. 711)

Cheng Yi, Zhenhui (Jack) Jiang, Xiuping Li, Xianghua Lu

This research investigates how firms can actively manage consumer-generated reviews in the form of *highlighting* authentic reviews on review platforms. While highlighting a positive review is expected to lead to positive product evaluation, this practice may elicit consumers' skepticism when consumers are aware of the promotional intent of the firm. Our findings show that consumers often pay attention to a firm-highlighted review and anchor on it to process other reviews of the business; however, such an anchoring effect may not be favorable when consumers are skeptical about the highlighted review. When a business has highly varied ratings in an overall positive review context, or when a business has not established a strong reputation, it is useful for the business to alleviate consumers' skepticism by highlighting a positive yet conservative review (i.e., a review with a 4-star rating out of 5). However, when all the reviews converge toward a positive or moderately positive assessment, or when the business has already established a good reputation, highlighting an extremely positive review may be an even more effective marketing strategy.

Knowledge Transfers in Alliances: Exploring the Facilitating Role of Information Technology (p. 726)

T. Ravichandran, Simona Ileana Giura

Although firms in many industries have been forming alliances at an increasing rate in their effort to develop new competencies by learning from their partners, many alliances fail to achieve their learning goals. In this study, we investigate how information technology (IT) can help firms to deal with this problem. We explicate four mechanisms through which IT will enable knowledge flows between alliance partners: decrease the knowledge dispersion inside an organization and increase knowledge transparency; provide the infrastructure to create multiple links between alliance partners; enable weak ties among

people in the partnering firms; and increase communication and social interaction. Our findings based on data from 272 firms suggest that knowledge flows to a firm are enhanced when the focal firm and its partner in an alliance have high IT intensity. We find support for our argument that IT is a necessary complementary resource that facilitates learning from partners in alliances.

Balancing Openness and Prioritization in a Two-Tier Internet (p. 745)

Barrie R. Nault, Steffen Zimmermann

The open internet is plagued by congestion that restricts the development of sophisticated internet-based services. Broadband and edge providers have proposed a two-tier internet with a fee-based fast lane that coexists with the open internet. This requires a restriction of internet openness, also known as network neutrality, in the fast-lane internet. Opponents of a two-tier internet believe it would hinder innovation and cause underinvestment in the open internet. The challenge is for policy to balance a fee-based fast lane with the viability of the open internet. We find that edge providers with greater bandwidth requirements per unit of output convert to the fast lane and that the fast lane can drive innovation from edge providers with high bandwidth requirements. The broadband provider chooses fixed fee pricing for the fast lane but has no incentive to increase internet capacity as long as the open internet is not monetized. With no investments in internet capacity, all edge providers of the open internet and their end users are worse off with a two-tier internet. To maintain quality-of-service in the open internet and to increase social welfare, a two-tier internet has to be coupled with policy whereby a portion of broadband provider profit is invested in internet capacity.

Does Superposition Influence the Success of FLOSS Projects? An Examination of Open-Source Software Development by Organizations and Individuals (p. 764)

Poonacha K. Medappa, Shirish C. Srivastava

Does the task work orchestration in free (Libre) and open-source (FLOSS) software projects influence the

project's success? Does satisfying the psychological needs of the contributors effectively scale up to the level of the project and manifest as project success? For answers, we developed an innovative approach to operationalize and study the degree to which a project's task work consisted of sequential layering of individually developed tasks, referred to as "superposed organization of tasks." Using this measure on a large sample of FLOSS projects hosted on GitHub, we found that the degree of superposition exhibited an inverted U-shaped relationship with project success, indicating the presence of an optimal value for the project's work structures. Further, organizational ownership of projects introduced practices that tended to influence the nature of this relationship. The greater the organization owner was willing to invest in the project by contributing code and employees' time, the lesser was the overall influence of superposed work structures on the success of the project. The greater the organization owner invested in the support activities of the FLOSS project, greater was the time-cost of money—creating a higher need for efficient development practices in lieu of superposition.

Personalized Mobile Targeting with User Engagement Stages: Combining a Structural Hidden Markov Model and Field Experiment (p. 787)

Yingjie Zhang, Beibei Li, Xueming Luo, Xiaoyi Wang

Low engagement rates and high attrition rates have been formidable challenges to mobile apps and their long-term success. To date, little is known about how companies can scientifically detect user engagement stages and optimize corresponding personalized-targeting promotion strategies to improve business revenues. This paper proposes a new structural forward-looking hidden Markov model as combined with a randomized field experiment on app notification promotions. Our model can recover consumer latent engagement stages by accounting for both the time-varying nature of users' engagement and their forward-looking consumption behavior. The structural estimates from the FHMM with the field-experimental data enable us to identify heterogeneity in the treatment effects. Additionally, we simulate and optimize the revenues of different personalized-targeting promotion strategies with the structural estimates. Personalized dynamic engagement-based targeting based on the FHMM can generate substantially higher revenues than the experience-based targeting strategy applied by current industry practices and targeting strategies based on alternative customer segmentation models. Overall, the novel feature of our paper is its proposal of a new personalized-targeting approach combining the FHMM with a field

experiment to tackle the challenge of low engagement with mobile apps.

Word-of-Mouth System Implementation and Customer Conversion: A Randomized Field Experiment (p. 805)

Ni Huang, Tianshu Sun, Peiyu Chen, Joseph M. Golden

Online retailers often face the decision on whether they should implement a word-of-mouth (WOM) system on their websites. Some retailers opt not to have an in-site WOM system (e.g., Tiffany.com and Tjmaxx.com), whereas others implement and manage an internal WOM system (e.g., Amazon.com and Macys.com). The authors conducted a randomized field experiment to examine how implementing an in-site WOM system from ground zero influences customer conversion in an online retailing website. Their results demonstrate that implementing an in-site WOM system can be a double-edged sword to the online retailing website. Specifically, the impact of a WOM system implementation on customer conversion is moderated by WOM volume, such that its effect is positive above a threshold of volume and negative below the threshold. Additionally, the researchers find that WOM valence reinforces the impact of a WOM system on customer conversion. These results offer important implications for the hundreds-of-billion-dollar online retailing industry on the implementation and management of online WOM systems.

Measuring the Value of Recommendation Links on Product Demand (p. 819)

Anuj Kumar, Kartik Hosanagar

All e-commerce websites recommend related products on a product's page. According to McKinsey & Company retail report, 35% of what consumers purchase on Amazon and 75% of what they watch on Netflix are attributable to such recommendations. Most recommendation algorithms recommend a product on other products' pages based on how frequently it is viewed or purchased with other products. Consumers are most likely either already aware of or can easily discover such popular products with the help of search and browsing tools on e-commerce websites without recommendations. Attributing product sales to recommendations without controlling for the effect of these factors could be the reason for these inflated estimates. We designed a large-scale randomized experiment on a fashion retailer's website to estimate the true effect of recommendations on product sales after controlling for other factors. We find that recommendations increase the sales of recommended products by 9% but at the expense of a 1.9% decrease in sales of focal

products, or the original products consumers viewed. Overall, product recommendations boosted the total product sales by 11%. We further found that recommendations didn't affect all products alike. More popular products that were linked to lots of other products got more of a boost, whereas less popular products had worse sales with recommendations. These findings inform the recommendation strategies of retailers and marketers, such as how to boost the sales of their products with its sponsored recommendations of another product's page.

Understanding User-Generated Content and Customer Engagement on Facebook Business Pages (p. 839)

Mochen Yang, Yuqing Ren, Gediminas Adomavicius

With the growth and prevalence of social media platforms, many companies have been using them to engage with customers and encourage user-generated content about their products and services. In this paper, we analyze user-generated posts from the Facebook business pages of multiple companies across several industries to understand what users post on Facebook business pages and how post valence and content characteristics affect engagement, measured as the number of likes and comments received by a post. Our analysis demonstrates that negative posts are significantly more prevalent than positive posts, and negative posts also tend to attract more likes and more comments than positive posts. Importantly, engagement depends not only on the valence of a post but also on the specific post content. We observe three types of customer complaints respectively related to product and service quality, money issues, and corporate social responsibility issues. We show that social complaints receive more likes, but fewer comments, than quality or money complaints. Our findings reveal the practical challenges of managing Facebook business pages as a new channel of interacting with customers, and they highlight the need to explore effective response strategies to manage customer complaints and other service requests on social media.

Does It Pay to Shroud In-App Purchase Prices? (p. 856)

Jeffrey D. Shulman, Xianjun Geng

Should mobile app platforms make it harder or easier for consumers to discover in-app purchase prices before they purchase an app? This research provides insights for both platforms and the app developers who are on them. Common intuition would suggest that platforms that earn commission on revenue from both apps and in-app content would benefit from extreme shrouding, because competing app developers can exploit their customers with monopoly pricing on the in-

app content. However, our research shows that established app platforms, such as the Apple App Store and Google Play, and emerging app platforms, such as Slack and Alexa, should choose a shrouding level that results in at least some consumers observing the in-app purchase price. This paper uniquely finds a nonmonotonic relationship between shrouding of in-app purchase prices and profitability. As a consequence, platforms should also avoid making in-app purchase prices completely transparent such that all consumers observe the prices. The optimal decision is a moderate degree of shrouding, in which some consumers become informed of in-app purchase prices yet other consumers choose not to read (or listen) through all the way to discover the prices.

When a Doctor Knows, It Shows: An Empirical Analysis of Doctors' Responses in a Q&A Forum of an Online Healthcare Portal (p. 872)

Sandeep Khurana, Liangfei Qiu, Subodha Kumar

Healthcare portals are gaining in popularity, connecting doctors with potential consumers of healthcare services. As online search and transaction marketplaces, they bring both sides of the market onto the same platform. Managers or platform owners seek to create value by increasing the number of users on either side of demand and supply of services. User-generated activity on Q&A forums of such sites reduces information asymmetry and indicates an increased adoption by either side. In this study, we have provided insights into understanding drivers for increased recommendations for doctors in online healthcare-services marketplace. The identification of these drivers and their directionality, interplay, and magnitude of impact are all of direct relevance to site promoters and managers as well as users. We find that the introduction of doctors' responses has a significant causal impact on demand-side user perception of medical services offered. More importantly, our research suggests that doctors' specialty, experience, qualifications, transparency in appointment booking, service fees, and response quality moderate the effect of doctors' Q&A responses on user recommendations.

Beauty Is in the Eye of the Beholder: Toward a Contextual Understanding of Compensation of Information Technology Professionals Within and Across Geographies (p. 892)

Jonathan Whitaker, Sunil Mithas, Che-Wei Liu

This study provides new insights on compensation and human resources practices of multinational corporations (MNCs) and how they differ from those of domestic companies. The authors focus on cross-geography differences in compensation for IT professionals and take a closer look at returns on master of

business administration (MBA) education and information technology (IT) experience. They analyze data on more than 20,000 IT professionals across the United States and India and compare practices of United States-based MNCs and India-based firms for IT professionals in India and of United States-based MNCs for IT professionals in the United States and India. The study finds that MNCs source IT talent from emerging markets because of the lower cost of IT professionals in these markets, coupled with the availability of a large pool of technically qualified professionals. For IT professionals in India, results indicate that United States-based MNCs pay a premium (compared with India firms) for each year of IT experience. By contrast, India firms pay a premium (compared with United States-based MNCs) for IT professionals in India with an MBA. Interestingly, whereas United States-based MNCs do not pay a premium for MBA education in India, they do pay a premium for MBA education in the United States. The findings are informative for IT professionals to decide whether to pursue an MBA or invest in gaining firm-specific experience. The results also provide indirect evidence that MNCs apply a portfolio approach to optimize their profits by using knowledge workers in various locations based on their skills and costs.

Triadic Closure, Homophily, and Reciprocation: An Empirical Investigation of Social Ties Between Content Providers (p. 912)

Tingting Song, Qian Tang, Jinghua Huang

In social media, ties between content providers as an organic recommendation mechanism enable users to explore content. A provider can initiate outgoing ties to other providers to cross-promote their content. On receiving the incoming ties, these responding providers then decide whether to reciprocate. Confirming that reciprocation is beneficial for the initiator to attract more subscribers, we find that the reciprocation benefit is negatively moderated by content similarity between the two providers and their common ties with other providers, although both content similarity and common ties increase reciprocation probability. Specifically, a 10% increase in content similarity decreases the reciprocation benefit by 27.2%, and one additional common tie reduces the reciprocation benefit by 12.6% on average. Therefore, providers can take different networking strategies for different objectives. New providers aiming for more reciprocations can initiate ties to providers with similar content or more common ties, whereas well-established providers can reach out to providers with fewer common ties to gain subscribers or to providers with similar content to grow views. To maximize the expected benefit of integrating both reciprocation probability and benefit, a provider should link to more

content-similar providers among those with few common ties and more content-different providers among those with many common ties.

“Level Up”: Leveraging Skill and Engagement to Maximize Player Game-Play in Online Video Games (p. 927)

Yan Huang, Stefanus Jasin, Puneet Manchanda

We propose a novel two-stage data-analytic modeling approach to gamer matching for multiplayer video games. In the first stage, we build a hidden Markov model to capture how gamers’ latent engagement state evolves as a function of their game-play experience and outcome and the relationship between their engagement state and game-play behavior. We estimate the model using a data set containing detailed information on 1,309 randomly sampled gamers’ playing histories over 29 months. We find that high-, medium-, and low-engagement-state gamers respond differently to motivations, such as feelings of achievement and need for challenge. For example, a higher per-period total score (achievement) increases the engagement of gamers in a low or high engagement state but not those in a medium engagement state; gamers in a low or medium engagement state enjoy within-period score variation (challenge), but those in a high engagement state do not. In the second stage, we develop a matching algorithm that learns (predicts) the gamer’s current engagement state on the fly and exploits that learning to match the gamer to a round to maximize game-play. Our algorithm increases gamer game-play volume and frequency by 4%–8% conservatively, leading to economically significant revenue gains for the company.

Using Technology to Persuade: Visual Representation Technologies and Consensus Seeking in Virtual Teams (p. 948)

Chih-Hung Peng, Nicholas H. Lurie, Sandra A. Slaughter

How do virtual teams reach consensus when there is disagreement among team members and the consequences of making the wrong decision are high? To answer this question, the authors examine the daily chat room discussions and decisions of a virtual team responsible for air quality forecasting for the 5-million-person Atlanta region in the United States. They show that team members increase their use of visual representation technologies (VRTs), such as weather maps, during chat room discussions when the initial team consensus is low and the team is deciding whether to issue a smog alert that has large economic and health consequences. More use of VRTs in team discussions is associated with bigger shifts in the initial to final consensus forecasts of the team and greater likelihood that the team changes its forecast to

issue a smog alert. Greater use of VRTs is not associated with greater forecast accuracy. Increased VRT use is also associated with greater imagery processing and increased group cohesion. For managers these results show that, in virtual team settings, some information technologies are associated with more persuasion than others and that training teams on the advantages and disadvantages of persuasive technologies is important.

Large Online Product Catalog Space Indicates High Store Price: Understanding Customers’

Overgeneralization and Illogical Inference (p. 963)

Yunhui Huang, Kai H. Lim, Zhijie Lin, Shunping Han

Although e-commerce has been around for more than two decades, it is still so relatively new to most consumers that they often draw parallel from the bricks-and-mortar world to make (sometimes illogical) inference about the online world. This study demonstrates how one such illogical inference can affect customers’ price perception. Through a series of five experiments, we show that an online store with larger online product catalog space is perceived to be selling more expensive products, and thus customers who care more about quality (price) evaluate it more (less) positively. This is because customers have learned that large interstitial space among products in a bricks-and-mortar store is associated with high price, and they simply use this association without thinking that online space is not costly and should not signal high price. Therefore, when an online store is price oriented and would like to attract customers who place great importance on price, it should not present large space around their products in the product catalog. On the contrary, if an online store would like to attract customers who care more about quality, it should show a loose product catalog that is not at all costly but transmits a high-price store image.

Crowd-Driven Competitive Intelligence: Understanding the Relationship Between Local Market Competition and Online Rating

Distributions (p. 980)

Dominik Gutt, Philipp Herrmann,
Mohammad S. Rahman

Crowdsourced online mean ratings of local businesses are increasingly being used to infer the market power of a business. An important consideration in making this inference is whether two identically rated businesses (e.g., 4 stars) encounter the same local competitive dynamics if they face contrasting local market competition. To analyze this, the authors combine demographic, socioeconomic, and Yelp restaurant reviews for 372 isolated markets in the United States. The empirical estimates demonstrate that an increase in overall competition—measured as total number of businesses

in a market—leads to a broader range and to a decrease in the average of a market’s mean rating distribution. This implies that two restaurants with equal mean ratings differ substantially in the way they are affected by local competition depending on whether they are located in a large or in a small market. For example, a larger market has proportionately more lower rated restaurants, whereas higher rated restaurants have relatively fewer comparable substitutes and face less competition in such a market. Therefore, restaurants with identical mean ratings should ideally be assessed differently if they operate across markets with dissimilar numbers of competitors.

Why Would I Use Location-Protective Settings on My Smartphone? Motivating Protective Behaviors and the Existence of the Privacy Knowledge–Belief Gap (p. 995)

Robert E. Crossler, France Bélanger

Smartphones have become essential for functioning in society, but as more personal information is accessed, transferred, or stored on smartphones, users struggle to control the release of their information via privacy settings. To enhance their privacy, individuals must be knowledgeable about their smartphone and motivated to use the device’s settings. Therefore, we explore the roles of knowledge and motivation in affecting smartphone owners’ use of settings to limit sharing of location-based information. The authors find that personal motivation is the strongest factor affecting such use, and the opinions of others do not matter. This is likely because of the personal nature of smartphones. Furthermore, privacy knowledge and individuals’ perceptions of their abilities to use privacy settings also affect this usage. However, a privacy knowledge–belief gap exists by which people with high levels of privacy knowledge utilize less restrictive privacy settings when their confidence in protecting themselves is low. The combined lack of effect from social motivation and the importance of perceived and actual privacy knowledge suggest that asking parents, teachers, or “important” others to tell individuals how to better protect themselves is unlikely to give the intended results. Instead, we need to appeal to individuals’ personal motivation and offer them training via experiential learning, such as games or educational apps.

Don’t Mention It? Analyzing User-Generated Content Signals for Early Adverse Event Warnings

(p. 1007)

Ahmed Abbasi, Jingjing Li, Donald Adjeroh,
Marie Abate, Wanhong Zheng

With greater impetus on broad postmarket surveillance, the Voice of the Customer (VoC) has emerged as

an important source of information for understanding consumer experiences and identifying potential issues. In organizations, risk management groups are increasingly interested in working with their information technology teams to develop robust VoC listening platforms. Two key challenges have impeded success. First, prior work has leveraged diverse sets of channels, adverse event types, and modeling methods, resulting in diverging conclusions regarding the viability and efficacy of various user-generated channels and accompanying modeling methods. Second, many existing detection methods rely on “mention models” that have low detection rates, have high false positives, and lack timeliness. Following the information systems design science approach, in this research note we propose a framework for examining key design elements for VoC listening platforms. As part of our framework, we also develop a novel heuristic-based method for detecting adverse events. We evaluate our framework and method on two large test beds, each encompassing millions of tweets, forums postings, and search query logs pertaining to hundreds of adverse events related to the pharmaceutical and automotive industries.

From Bricks to an Edifice: Cultivating Strong Inference in Information Systems Research (p. 1029)
Amrit Tiwana, Stephen K. Kim

MIS research studies often account for prior empirical research findings (i.e., they empirically cumulate) but do not *conceptually* build atop their ideas and those in adjacent research streams (i.e., they are theoretically less cumulative than they can be). An analogy for disciplines such as ours is that we end up making high-quality, standalone bricks when the intent all along was to build an edifice. We develop two philosophy-of-science ideas—nomological rubberbanding and retroduction—to help cultivate greater theoretical cumulation by shifting the MIS research community’s thinking from “weak” to “strong” inference. This shift characterizes faster-progressing disciplines such as molecular biology and nuclear physics. We use the IT-outsourcing literature to illustrate the application of the two ideas developed here. The two-pronged approach advocated here leverages the cross-disciplinary nature of the MIS discipline, the diversity of research traditions that it encompasses, and its strong culture of empirical cumulation.

Innovation and Policy Support for Two-Sided Market Platforms: Can Government Policy Makers and Executives Optimize Both Societal Value and Profits? (p. 1037)
Dawoon Jung, Byung Cho Kim, Myungsub Park, Detmar W. Straub

A prime example of an emerging two-sided market is the driverless vehicle industry, an industry that will get much of its software from one side of the market: specifically, application developers. Consumers stand at the other side of this market. To what extent will this marketplace reward both the industry itself and application developers for technological innovation? In modeling this first question and keeping in mind consumers’ appetite for technological advances, we provide nuanced answers for executives in the driverless industry, application development firms, and government. This question speaks directly to what level of investment is optimal. Given that high government officials want to encourage the future growth of this vibrant industry, a second key theme of the paper is as follows. Should governments subsidize the focal industry or developers based on the extent to which they are innovative? Or should governments subsidize consumers? Our models conclude that subsidizing the industry is the overall best strategy followed by subsidies for consumers under certain other conditions. We find that it is not in the interest of society to subsidize application developers. Executives can use our models and results to fine tune to match their own circumstances with basic changes in our parameters.

Seeing the Trees or the Forest? The Effect of IT Project Managers’ Mental Construal on IT Project Risk Management Activities (p. 1051)
Jong Seok Lee, Mark Keil, Eliezer Shalev

In this research, we focused on one of the core issues associated with Information Technology (IT) project management, namely the tendency to inadequately manage project risks. Project managers (PMs) surely must know by now that risks can derail projects and that tools and techniques are available to support the risk management process. Why, then, do many PMs seem unable or unwilling to adequately manage project risks? We believe that answering this fundamental question requires gaining a better understanding of how PMs construe risks. To gain this understanding, we examined key activities associated with the risk management process from a CLT perspective to determine the impact of construal on the judgment and decision-making of IT PMs when it comes to managing IT project risks. We found that IT PMs with a concrete mental construal (1) identify a greater number of project risks; (2) perceive a greater potential impact of project risks; (3) perceive that more effort and resources are required for risk management; and (4) are less willing to enact risk responses than IT PMs with an abstract mental construal. We demonstrate that IT PMs’ mental construal can affect activities that are important to risk management.

Software Patents and Firm Value: A Real Options Perspective on the Role of Innovation Orientation and Environmental Uncertainty (p. 1073)

Sunghun Chung, Animesh Animesh, Kunsoo Han, Alain Pinsonneault

Our paper shows that software-based patents can contribute significantly to the value of firms. Our paper provides managers with insights into how different types of software-based innovations affect firm value in market environments exhibiting different levels of competitiveness and dynamism. Using a large-panel data set consisting of 602 U.S. firms, we find that firms with a software patent portfolio having higher levels of explorative innovation orientation achieve higher market value in environments with high competitiveness and low dynamism. By contrast, firms

with a software patent portfolio exhibiting high levels of exploitative innovation orientation achieve higher market value in low competitiveness and high dynamism environments. Although some practitioners are still skeptical about the value of software patents, we provide empirical evidence that a firm's software patents do contribute to firm performance, thereby helping practitioners to justify their investments in software innovation and assess the value of their software patents. Furthermore, our paper highlights key factors—both internal (i.e., innovation orientation) and external (i.e., environmental uncertainty)—that may affect the value of software patents. This can help firms formulate the appropriate innovation strategy for software patents that can lead to the greatest returns.