Thursday, 9–10am

TA01

Virtual Room 01
Applied Theory
Special Sessions
Chair: Tommaso Bondi
Cornell University, New York, NY

1 - A Micro-Founded Model of Repeat Buying Based on Information Tracking

Tony Ke, Chinese University of Hong Kong, Shatin, Hong Kong

A consumer decides whether to incur a constant flow cost to keep track of information on a firm's new product, which updates her expected valuation according to a Brownian motion. The consumer's purchase need follows a Poisson arrival over time, and upon an arrival, she decides whether to make a purchase or not. We characterize the consumer's utility-maximizing tracking and purchasing decisions in closed form. Our model naturally generates three segments of consumers: buyers, trackers and deflectors, who differ in their expected valuations. We find that consumers who are about to drop out tend to purchase less frequently, and who are currently alive are more likely to stay alive and continue to make purchases in the future. This endogenous customer loyalty is captured by a one-parameter survivor function that features an initial steep drop and an asymptotic slow decay at the rate of inverse square root of time. Moreover, we prove sub-exponential distribution of purchase instances and provide closed-form formula for the firm's expected revenue. We show that consumers may benefit from a higher information tracking cost due to a lower price set by the firm. We estimate the model numerically by two methods: random walk simulation and numerically solving a heat diffusion equation. A comprehensive study shows that after incorporating consumer heterogeneity in the need arrival rate, our model provides a similar level of fit and prediction accuracy compared with popular existing models such as Pareto/NBD and BG/NBD. For the study, consumers' information tracking cost is estimated to be about $4.5 per annum. Based on the estimates, our model allows a marketing manager to infer the likelihood of which segment a consumer belongs to based on her past purchase history.

2 - Dynamic Price Competition: Theory and Evidence from Airline Markets

Aniko Oery, Yale School of Management, New Haven, CT , Ali Hortascu, Kevin Williams

We study dynamic pricing in a competitive setting where sellers are endowed with finite capacities and face uncertain demands toward a sales deadline. With perfect information, price dynamics are determined not only by changing own-sale opportunity costs and demand, but also by strategic incentives to soften future price competition. We study equilibrium properties and apply our framework to the airline industry using daily pricing and bookings data for competing airlines. We show that the use of pricing algorithms---similar to those implemented in practice---soften price competition but do not create additional dead-weight loss compared to the perfect information benchmark.

3 - Dynamic Pricing Under Adoption with Survival Bias

Harry Zihao Zhou, University College London, London, United Kingdom

We study how a firm launching a new product could use its dynamic pricing decisions to influence how consumers learn about the product's quality. In our model, the firm faces the trade-off between adoption and future per-sale revenue. The main result of our model predicts that the firm's pricing decisions have two stages: reputation building and expansion. In the reputation-building stage, as the perceived quality of the product improves, the firm gradually raises its price in order to encourage consumer learning. Once the product is well-thought enough, the product enters its expansion stage, where the firm cuts its price to discourage consumer learning, and the price path becomes constant to achieve optimal adoption.

4 - Competition with Consumer Ratings

Tommaso Bondi, Cornell University, New York, NY

We study the impact of consumer ratings on duopoly competition. Three features of the model are key. First, firms are strategic: they design their products anticipating the presence of consumer ratings, and dynamically adjust their prices as information about them is revealed (as is the case on platforms like eBay or AirBnB, for instance). Second, ratings can be informative about both product quality and consumers-products fit. Third, consumers can be either strategic or naive in their interpretation of ratings. The presence of ratings introduces novel tradeoffs for sellers, who find themselves optimizing a mix of present sales and future ratings: the two objectives are often at odds, since reaching more consumers today yield worse average ratings tomorrow. This leads firms to increase prices, and thus, consumer welfare need not improve with ratings. A similar result holds for the share of rational types: some naivete can be a blessing in disguise for consumers, as it reduces the unintended consequences of ratings.

TA02

Virtual Room 02
Behavioral IO & Marketing
Special Sessions
Chair: Kwabena Donkor
Stanford University, Stanford, CA
Co-Chair: Navdeep S Sahni
Stanford, Stanford, Stanford, CA

1 - The Dynamics of Following Defaults

Avner Strulov-Shlain, University of Chicago, Chicago, IL
Rawley Heimer, Alex Imas

2 - Consumer Preferences for Sustainability

Yewon Kim, Stanford Graduate School of Business, Stanford, CA

ESG (Environmental, Social, and Governance) - a concept that encloses a wide spectrum of values ranging from environmental sustainability to employee diversity - has become an important keyword for consumers, firms, and governments. Despite the large interests, little is known about consumer preferences for the ESG factors, such as which ESG message consumers prefer the most and whether those claims are substitutable with one another. This paper studies consumer preferences for and firm's practices of ESG values in the consumer packaged goods (CPG) market using information on product labels. The aim is 1) to help firms invest in ESG more effectively in a way that customers are actually responsive to, and 2) to help policy makers identify potential room for green- or ethics-washing by finding those claims without significant positive impact that consumers find particularly attractive.

3 - Empirical Analysis of Cognitive Limitations in Consumer Decision Making

Navdeep S Sahni, Stanford University, Stanford, CA
Konstantin Korotkiy

Typical consumer decisions involve comparing and choosing among multiple options, which requires consumers to spend limited cognitive resources. While cognitive limitations are important, it is hard to quantify their impact on consumer decisions and firm policies in natural settings: consumers may have unobserved idiosyncratic preferences and beliefs so it is hard for a researcher to ascertain consumer mistakes due to cognitive limitations. In this paper we use a novel dataset to overcome this difficulty and precisely identify consumer mistakes and use them to estimate the monetary equivalent cognitive costs at the individual level. We estimate a structural choice model to shed light on the underlying connections between cognitive costs, income, price elasticity, discount hunting etc. We use our model to study how grocery chain pricing strategies affect profits and social welfare for different customer strata.

4 - Workplace Risk and Motivated Beliefs

A. Yesim Orhun, University of Michigan, Ann Arbor, MI

We provide field evidence that individuals engage in motivated optimism in the face of impending risk, and that their belief distortions are time- and stake-dependent. Our study leverages exogenous variation in when people are required to return to their workplaces during the COVID-19 pandemic. Among workers currently staying at home, individuals who are tem- porally closer to returning to their workplace are relatively more optimistic about the increase in infection risk associated with going back. Temporal belief differences are larger for people who are more likely to get severely ill if infected.

5 - Identity and Economic Incentives

Kwabena Donkor, Stanford Graduate School of Business, Stanford, CA

This paper theoretically and empirically analyzes how identity (one's sense of self) affects consumption or investment decisions. We first present a model where identity distorts individuals' beliefs about uncertain outcomes and imposes psychic costs on identity-incongruent actions. Then, using two large field experiments on soccer betting in the UK and Kenya, we experimentally varied material incentives for betting on matches where soccer fans are neutral or favor one of the teams playing. Finally, we combine the model with respondents' portfolio allocations across different matches to disentangle biases in investment decisions due to over-optimistic beliefs and those due to the psychic costs from identity-incongruent choices. We find that, on average, respondents misallocate 10% of their investment budget because of their over-optimistic beliefs and misallocate an additional 15% of their budget to avoid psychic costs. Our experimental findings also suggest that the impact of debiasing information campaigns that target biased beliefs is limited in contexts with identity concerns than otherwise.

TA03

Virtual Room 03
Influencer Marketing I
Special Sessions
Chair: Andreas Lanz
HEC Paris, Paris, France

Co-Chair: Maximilian Beichert
University of Mannheim, Mannheim, Germany

1 - Influencer Racial Pay Gap

Amy Pei, Northeastern University, Boston, MA
Yakov Bart, Koen Pauwels, Kwong Chan

Using a rich data set from a US influencer marketing platform, we find that campaign-based payment received by Black influencers can be substantially higher than the payment received by White influencers. We test several alternative reasons for this finding and show that the racial gap is most pronounced for macro-influencers. We demonstrate how the effect can be explained by the combination of increased demand from brands to create more diverse campaigns while reaching large audiences and the disproportionally high number of White (vs. Black) macro-influencers. We discuss the resulting managerial and public policy implications.

2 - Value of a Thank You - How Non-profits Get the Most Out of Social Media Peer-to- peer Fundraising

Beatrice Martin, WHU - Otto Beisheim School of Management, Vallendar, Germany
Christian Schlereth

Non-profits rely heavily on fundraising to perform their services. Knowing how a fundraising channel works is key for professional fundraisers to distribute their resources accordingly. It is vital to study emerging fundraising channels: social media peer-to-peer (p2p) fundraising is one such channel that has recently gained immense traction. So far, we know little about the levers of a non-profit to boost the fundraising success of this channel. Limited research exists on social media fundraising in general, and while p2p fundraising has been around for a long time, there is barely any research on the topic. Thus, we aim to shed light on the mechanisms behind social media p2p fundraising. On social media, non-profits have only two ways to influence the number of donations they receive via p2p fundraising: First, they can attempt to increase the number of fundraisers started through advertising and call-to-actions. Second, they can try to influence the outcome of a fundraiser once it has been started. There exists a solid base of research for social media advertising. Thus we focus on the second aspect in this paper. The power of saying thank you to donors to retain them has been studied in-depth, but not in the context of p2p fundraising. Thus, we want to explore this question: What impact does saying thank you to the initiator of a social media p2p fundraiser have on its success? We use a set of 3 experiments to investigate different types of thank yous. We find that saying thank you significantly increases the number of donations to a social media p2p fundraiser. It is best to say thank you right at the start of a fundraiser and that, in this particular case, a picture is not worth more than 1000 words.

3 - Direct and Indirect Profits from Gift Giving: Consumer Learning about Underexplored Alternatives

Shi (Sherry) Wang, The Ohio State University, Columbus, OH
, Ralf Van der Lans

Gift giving is an important social activity that generates high profits for retailers and brands. In addition to direct profits, gifts may indirectly affect profits by influencing receivers' purchase behaviors. First, gifts may substitute receivers' purchases, reducing the profits from gifts indirectly. Second, gifts may influence receivers' subsequent purchase behaviors, especially when they are not fully informed about their preferences. In such scenarios, gift consumption provides an opportunity to learn about underexplored alternatives, which may generate additional future profits. This paper empirically investigates these direct and indirect effects of gift giving on profits using a unique panel dataset in which both givers' and receivers' purchasing, consumption and gifting behaviors are observed. The authors develop a new dynamic generalized linear model which captures both purchase incidences and choices before and after gift consumption. The results demonstrate that a significant number of gifts lead to a change in receivers' behaviors, leading on average to indirect profits of about 10 percent of the gift price. Indirect profits are more likely when receivers' purchase frequency and expected utility of the gift are lower prior to gift consumption, and when givers are more experienced and share similar interests with the receiver.

4 - Who to Target? Low- versus High-status Seeding in User-generated Content Networks

Maximilian Beichert, University of Mannheim, Mannheim, Germany
Andreas Bayerl, Jacob Goldenberg, Andreas Lanz

The battle for consumers' attention is constantly on the rise. Hence, marketers are looking for alternative, more efficient ways--such as influencer marketing--to reach out to their audiences. Recently, there have been more and more industry articles pointing out the value of low-status influencers (e.g., Haenlein et al., 2020). This goes against seeding literature in marketing, which almost unanimously recommends targeting high-status influencers, i.e., hubs with a large following (e.g., Goldenberg et al., 2009; Hinz et al., 2011). Given the accumulating empirical evidence that optimal seeding policies may very well be reversed (e.g., Lanz et al., 2019; Watts & Dodds, 2007), does it really pay off

to engage high-status influencers as opposed to low-status influencers when considering the whole influencer marketing funnel? To shed light on this question, we analyze secondary sales data from a major European fashion retailer mainly distributing its products via influencers and with the help of dedicated discount codes. These codes allow us to attribute the sales of more than 5 M items valuing over 159 M € to 9,072 influencers. In order to compare the sales performance of each influencer, we calculate the (fully attributable) revenue per reach and find that low-status influencers dominate high-status influencers: The revenue per reach is 2.6 times higher. In a parallel mediation analysis, we find that about two-thirds of the effect can be explained by intimacy. To validate the results from the secondary sales data, we conducted three (supply-side) field experiments. For these experiments, we collaborated with an influencer marketing platform to recruit low-status (N=68; N=60; N=36) and high-status (N=70; N=54; N=31) influencers. Both groups were given the same task to promote a product offering by posting a well-specified Instagram Story, which included a call-to-action. We find supportive evidence by replicating the results of the secondary data that high-status influencers may indeed not be as effective (as mostly implicitly assumed) compared to low-status influencers.

TA04

Virtual Room 04
CRM I
Contributed Sessions
Chair: Roelof Hars
University of Groningen, Groningen, Netherlands

1 - A Research on How to Build Brand Loyalty from Consumer-brand Relationship, While Identifying the Priority Among Brand Building Mediators
Akihiro Inoue, Keio University, Yokohama-City, Japan
Laduree Yuanchen Chen
The marketing plan of customer relationship management (CRM) has been a key issue so as to build brand loyalty. There exist several factors that are used for CRM and considered to have the effects on brand loyalty, such as brand love, brand evangelism. In this research, we attempted to identify the structural relationships and the priority among the factors so as to develop CRM program by applying the framework to K-Pop groups. Khamitov, Wang, and Thomson (2019) present the brand relationship elasticity of brand relationship factors on customer brand loyalty via the meta-analysis. Based on their conceptual framework, we focus on the two variables

for customer-brand relationships (brand love and emotional brand attachment) and the four mediator variables between customer-brand relationships and brand loyalty (brand evangelism, brand worship, brand co-creation, and bran two-way communication). We apply the above framework to the Japanese funs of the two K-Pop groups (BTS and TWICE), very popular among the Japanese as well as the many other countries. In terms of the degree of involvement and the development of brand loyalty, some secondary data show the extreme high level for BTS and the moderate level for TWICE. We collected the data (N=216) via a marketing research company in December 2021 with some screening conditions such as in past 5 years at least 5 times participated to either BTS or TWICE live concerts, at least $700 spent on official goods of either group, age, and so on. We run the structural equation modeling on the data and found the significant direct effects and the mediator effects of the variables of concern. Furthermore, by running the multiple group analyses, we found the heterogeneous structure between the two groups and found the similar heterogeneity between the super-high and high involvement groups. The details are to be mentioned in the presentation.

2 - The Impact of Co-branded Credit Card Adoption on Customer Loyalty
Nan Zhao, Washington University in St.Louis, St Louis, MO
Arun Gopalakrishnan, Chakravarthi Narasimhan
We study how the adoption of co-branded credit card affects customer behaviors and loyalty using a comprehensive longitudinal dataset from a North American airline. To mitigate the challenge of selection bias, we use a multi-pronged strategy that includes propensity score matching of card adopters and non-adopters using a battery of behavioral and demographic variables, as well as difference-in-differences analysis with appropriate individual and time fixed effects. We also explore possible selection due to unobservables by estimating effects beyond immediate adoption and heterogeneous treatment effects across segments that may differ in the unobservables that drive selection. We find that card adoption increased flight spend and number of flights taken on the airline in the short-, medium-, and longer-term. We also find an increase in loyalty program behaviors due to card adoption including loyalty miles earned and redeemed with the focal airline.

3 - How do Customer Relationships Evolve? Evidence from Touchpoint Dynamics
Roelof Hars, University of Groningen, Groningen, Netherlands
Hans Risselada, Jaap Wieringa

Understanding how existing customer relationships evolve is a key goal for marketing managers interested in learning how customers should be approached at any given time. Prior work has identified that relationships go through different states, and has studied how touchpoints serve as relationship signals by affecting the transition between these states. In this paper, the authors show that the effects of touchpoints on relationship evolution are heterogeneous. This makes it difficult for managers to identify what the use of a touchpoint says about a specific customer's motivation and future trajectory, especially in business-to-customer settings. Using a customer journey lens, the authors estimate a state space model on a unique longitudinal dataset containing over three years of daily data of 10.000 customers in the insurance industry, and find that past touchpoints visited by a customer moderate the effect of later touchpoints. The authors show that including a customer's prior journey adds important contextual information which aids in the prediction of relationship evolution and improves firms' capacity to understand the 'signal value' present in customer touchpoint use.

TA05

Virtual Room 05
Platforms & Technology Effects on Welfare
Special Sessions
Chair: Georgios Zervas
Boston University School of Management, Brookline, MA
Co-Chair: Pinar Yildirim
University of Pennsylvania, Philadelphia, PA
Co-Chair: Yufeng Huang
University of Rochester, Rochester, NY
Co-Chair: Kosuke Uetake
Yale School of Management, New Haven, CT

1 - The Welfare Effects of Vertically Integrated Platforms: Evidence from E-Commerce Platforms
Andrey Fradkin, Boston University, Boston, MA
Chiara Farronato

Platforms that help match many fragmented buyers and sellers of goods and services sometimes vertically integrate, by directly selling their own products. Take Amazon, one of the most important companies in the world as measured by the amount of economic activity passing through its market ($475B), its valuation ($1.74T), and its number of employees (1.5M). Amazon owns a variety of private labels, including Amazon Basics, Pinzon, and GoodThreads, which directly compete with independent sellers. We propose a new field experimental methodology for measuring the welfare benefits and costs of this form of vertical integration in e-commerce.

2 - The Effect of Default Privacy Choices on Consumer Welfare
Tesary Lin, Boston University, Cambridge, MA

Are revealed preferences the true preferences for privacy when consumers' privacy valuations are influenced by the default frame? Should policymakers ask companies to seek consumers' informed consent for data processing under an opt-in, opt-out, or forced-choice frame? We seek to answer these questions using a large-scale online experiment that solicit revealed preferences for consumers' social media data under different decision frames. The experiment quantifies the degree to which each default interface distorts privacy choices and saves limited cognitive resources relative to a forced-choice scenario. We compare the net effect of these two forces on consumer welfare and discuss their implications on regulating privacy consent interfaces.

3 - The Value of Professional Ties in B2B Markets
Navid Mojir, Harvard Business School, Boston, MA
Sriya Anbil

We study how a particular form of social ties (i.e., professional ties proxied by past employment) affect price and profitability in business-to-business (B2B) markets. While most of the work on social ties focuses on information diffusion in business-to-consumer markets, we ask: Do B2B buyers receive higher or lower prices from sellers with whom they have professional ties? Answering this question is challenging because it is difficult to observe B2B prices, the individual decision-makers (IDMs), and elements of differentiation that drive price variation. We resolve these challenges by leveraging confidential data from the Federal Reserve on the repo market, the largest market for short-term loans with daily transactions of over $2 trillion. In addition, we use financial disclosure laws to unmask IDMs at sellers and use LinkedIn to reveal their ties. We show that a seller IDM who is the buyer's former employee charges the buyer, on average, 25 basis points more than other buyers with no ties. This extra expense translates into 1.6% of additional revenue for the average seller. The mechanism driving this price increase involves a reliability premium. Sellers with a professional tie to the buyer act more reliably towards the buyer in the face of supply-demand imbalances. Our work suggests professional ties can affect B2B prices beyond observable supply-demand dynamics and provide value for sellers and buyers.

4 - Technological Change and Occupational Mobility

Pinar Yildirim, University of Pennsylvania, Philadelphia, PA
Maria Petrova, Gregor Schubert

We study the career mobility and wage implications of technological changes in the labor market using a novel data set of more than nine million individual resumes from the . Considering a combination of occupational movements and future wage changes, we calculate how individuals' lifetime earnings and employment expectations are impacted upon significant technological shifts. We find that technological shifts reduce vertical mobility, particularly into management roles. Restriction to career mobility are more pronounced for those with less than college education and in blue collar positions.

TA06

Virtual Room 06
Machine Learning and AI
Special Sessions
Chair: Venkatesh Shankar
Texas A&M University, College Station, TX

1 - Browsing the Aisles or Browsing the App? How Online Grocery Shopping is Changing What We Buy

Sai Chand Chintala, Cornell University, Ithaca, NY
Jurate Liaukonyte, Nathan Yang

This paper studies the impact of the online grocery retail channel on the variety and composition of shopping baskets. We use data from around one million shopping trips that capture both offline (brick-and-mortar) and online (Instacart) shopping behavior. We use unsupervised machine learning algorithms that are agnostic to the channel type to infer what constitutes a regular restocking shopping trip for each household. Our empirical analysis reveals that shopping basket variety, as measured by the number of categories purchased, is lower for online shopping trips and that the composition differs from offline trips in identifiable ways. We find that Instacart shopping baskets typically have 19.6% fewer fresh vegetable items and fewer items from impulse purchase categories that include candy (6.6%), bakery desserts (5.7%), and savory snacks (4.1%). Importantly, these fresh vegetables and impulse purchases are not picked up via alternative or additional shopping trips within a seven day period. We show that these purchasing patterns are unlikely to be driven by price or assortment differences across the two channels or stock-outs due to Covid-19. Finally, we find that within a given household, the Instacart baskets are significantly more similar to each other than offline baskets, potentially suggesting a past-orders-shortcut mechanism behind our results.

2 - The Effects of Underlying Product Features on Sales: A Machine Learning Approach to Analyze Images and Reviews

Chi Zhang, Texas A&M University, College Station, TX
Venkatesh Shankar

Product appearance and user experience of products have significant influences on product sales. However, what underlying features in product appearance are associated with high or low aesthetics? What underlying features contribute most to user experience? What are their effects on sales? In this paper, we identify and quantify such underlying features and investigate their effects on sales using deep learning models of images and natural language processing methods of text. We assemble and analyze a large dataset consisting of 362 models from 49 automobile brands in the during 2002-2020 with 12,305 images and 137,692 consumer reviews. Specifically, we use product images and their aesthetic ratings to train convolutional neural networks and apply Grad-CAM algorithms to generate heatmaps that highlight the unattractive elements in product appearance for each product. Furthermore, we use supervised contrastive learning to identify and quantify the underlying features that most affect product appearance. We apply a latent Dirichlet allocation (LDA) model on the product review data to extract the underlying features that most affect the user experience of products. The image analysis shows that three underlying features, namely, hatchback design, streamlined design, and box-like design, affect the aesthetics of product appearance. The text analysis reveals that four features, namely, reliability, fun, comfort, and fuel efficiency underlie user experience. The empirical analysis reveals that for economy cars, streamlined designs are associated with better sales. Economy cars high on comfort, fuel efficiency, or reliability outsell economy cars high on fun. However, luxury/sporty cars high on fun sell more than those high on comfort, fuel efficiency, or reliability. The output of the image analysis comprising heatmaps highlights the 'unattractive' elements in car designs that product designers can use to validate initial design ideas before finalizing the product. Thus, the analysis approach results have direct managerial implications for car makers.

3 - Consumer and AI Co-creation: When and Why Nudging Human Participation Improves AI Creation

Mengxia Zhang, Western University, London, ON, Canada
Lan Luo

Firms are increasingly leveraging artificial intelligence (AI) to automatically create personalized products (e.g., custom photo products, home designs) for consumers. While AI automation substantially saves consumer effort, it may also reduce consumer engagement potentially leading to a high dropout rate. We conduct three studies to investigate whether and how firms should nudge consumers to participate in product co-creation with AI automation. Using a field experiment involving 128,153 consumers, we find that a simple nudge can significantly increase consumer participation in product co-creation with AI by 12%. The nudged participation further increases immediate purchase by 22% and post-experiment purchase by 2%. Such purchase lifts are greater when consumers create more complex projects, have prior creation experience, or have lower opportunity costs of time. Our second experiment explores how and why firms should encourage consumer-AI co-creation. We learn that nudging attention (e.g., prompting a preview of the creation) rather than participation does not increase purchase and revisit intentions, and that mandating participation is less effective than nudging participation. Mediation tests show that the IKEA effect ('I made it myself') plays a bigger role than preference fit in explaining the positive effects of nudging participation. Our third experiment further investigates the interplay between AI creation and nudging participation. We find that nudging participation increase purchase and revisit intentions only when AI creation is present. The consumer-AI co-creation brings the best of both worlds by leveraging AI to save upfront effort and prompting humans to engage in the creative process only if desired.

4 - Can an AI Coach Help You Lose More Weight than a Human Coach? Empirical Evidence from a Mobile Fitness Tracking Application
Sridhar Narayanan, Stanford University, Stanford, CA
Anuj Kapoor, Puneet Manchanda
Artificial intelligence (AI) assisted tools are increasingly being used in health care contexts to provide advice and motivation. But whether AI can be a good or even better substitute for human involvement in these contexts is an open question. We provide empirical evidence to answer this question specifically in the context of fitness tracking mobile applications (apps). In addition to facilitating the tracking of activity and food intake, such apps provide advice and motivation in the form of targeted messages to their consumers, and this can be done through human coaches or an AI coach. An AI coach allows these apps to scale their offerings to a larger number of consumers, are available on demand to consumers, and are potentially more finely targeted by leveraging vast amounts of data. On the other hand, human coaches might be better placed to show empathy, and consumers might also feel more

accountable to humans. We compare human and AI coaches on their effectiveness in helping consumers achieve their weight-loss goals. Our empirical analysis is in the context of a large-scale mobile app that offers consumers different levels of subscription plans with human and AI coaches respectively, and specifically compare adopters of the two kinds of plans on their weight loss and goal achievement. We address the potential self-selection in plans by employing a matching-based approach. We find, for our sample of almost 65000 consumers that human-based plans do better than those in AI-based plans in helping them achieving their goals, but that this differs by consumer characteristics, including age, gender and body mass index (BMI).

TA07

Virtual Room 07
Causal Inference: Methods and Applications
Special Sessions
Chair: Yiting Deng
University College London, University College London, London, United Kingdom
Co-Chair: Puneet Manchanda
University of Michigan, Ann Arbor, MI

1 - Statistical Inference for the Factor Model Approach to Estimate Causal Effects in Quasi-experimental Settings
Kathleen Li, University of Texas at Austin McCombs School of Business, Austin, TX
Garrett Sonnier
Causal inference using quasi-experimental data is of great interest to marketers. The factor model approach (FM) to estimate treatment effects accommodates a large number of control units and can easily handle a large number of treatment units while flexibly allowing for cases where the treatment is outside the range of the control units. However, the factor model method lacks formal inference theory, instead relying on bootstrap or permutation procedures with strong assumptions. Specifically, the extant Xu (2017) bootstrap procedure requires that the treatment and control error variance are equal. We establish that when this assumption is violated, the bootstrap procedure results in biased coverage intervals. We develop formal inference theory for the factor model approach to estimate the average treatment effect on the treated (ATT). Our approach allows researchers to formally quantify uncertainty through hypothesis testing and confidence intervals. Our inference method is applicable to both stationary and non-stationary data. More importantly, our inference theory

accommodates treatment and control unit outcomes with different distributions, which includes different error variances as a special case. We show the performance of our inference theory in simulated data. Finally, we apply our method to empirically quantify the uncertainty in the effect of legalizing recreational marijuana on the beer market and the sales effect of a digitally native online brand opening a physical showroom.

2 - Announcement Effects on Vaccine Discussions
Dinesh Puranam, University of Southern California, Los Angeles, CA
Piyush Anand, Vrinda Kadiyali
The Covid-19 pandemic has brought a long-running debate on vaccinations to the forefront. On one hand, anti-vaxxers hold that vaccines are harmful and can lead to dangerous side effects in children like autism. Pro-vaxxers believe the opposite. As the science on Covid-19 vaccines (and their side effects) evolved during the pandemic, public authorities like the Centers for Disease Control and Prevention and the U.S. Food and Drug Administration made vaccine-related announcements that included both successes and failures. For example, the J&J vaccine distribution was put on hold when it was discovered that the vaccine could lead to blood clots. These announcements could influence public perceptions and rates of vaccine hesitancy and have long-term consequences on healthcare consumption. Consequently, we estimate the effect of vaccine related announcements on vaccine discussions and stance from public discourse on Twitter. Specifically, we examine how these announcements affect a) vaccine stance (both for and against), and b) engagement across the political spectrum. Methodologically, we extend transformer-based models to predict stance from tweet text and supplemental user-level metadata. To quantify the effect of an announcement on vaccine stance we adapt Bayesian structural time series models to an event study framework. Overall, we find that Pro Vaccine activity and engagement has increased significantly. Effects are short lived with respect to announcements, but the cumulative impact is sustained. Our findings are relevant to both policymakers and marketers dealing with polarized consumers.

3 - Expert Opinions and Consumer Reviews: Evidence from the Michelin Guide
Yiting Deng, University College London, London, United Kingdom
Xingyi Li, Puneet Manchanda, Bert De ReycK
The consumer purchase journey is influenced by both expert opinions and consumer reviews. However, it is not clear whether favorable expert opinions improve or hurt consumers' quality evaluations. This paper explores the effect of expert opinions on consumer reviews in the context of Michelin stars in the restaurant industry. We constructed a unique data set based on the Michelin Guide for Great Britain & Ireland from 2010 to 2020. For each restaurant that was awarded Michelin stars during these 11 years, we collected online consumer reviews from TripAdvisor and retrieved relevant historical menus. Based on the data, we first estimate the effect of Michelin star changes on the sentiment and content of consumer reviews. We find that when a restaurant is removed from the Michelin Guide or lose stars, consumers' review ratings increase, and consumers become less demanding regarding service and value for money. Next, we analyze restaurant menu, and find that restaurants tend to modify menu structure and adapt menu price in response to the Michelin star awards. We discuss managerial implications for restaurants and the Michelin Guide.

4 - Amazon vs. Walmart: A Comparative Analysis of Responsiveness to the COVID-19 Pandemic
Lakshmi Vana, Dartmouth College Tuck School of Business, Hanover, NH
Sharmistha Sikdar, Vrinda Kadiyali
As the Covid-19 pandemic brought about lockdowns and restrictions on movement, retail sales increasingly moved online with online retail sales increasing by 37% year-on-year in 2020 in the US. This increase was largely fueled by the growth of the two largest retailers, Amazon and Walmart. In this research, we construct time-series data of over 1,500 identical products belonging to 7 product categories sold on Amazon as well as Walmart from June 2020 to December 2021 and explore how the price, stocking, and shipping evolved pre- and post-peaks of Covid waves in the US. In addition, we also identify products that were sold uniquely only on either Amazon or Walmart but not both and compare how the price, stocking and shipping evolved for these products compared to the ones sold on both the platforms. Lastly, we augment the analysis by analyzing the text content of online reviews for these products posted during the data duration on the two platforms to provide supporting evidence for the mechanism for our results.

TA08

Virtual Room 08
Brand and Marketing Strategy
Contributed Sessions
Chair: Sayan Gupta
University of Pittsburgh, Pittsburgh, PA

1 - Why are Firms Different
Birger Wernerfelt, Massachusetts Institute of Technology,

Cambridge, MA

We analyze a model in which two firms invest in stocks of complementary strategic resources. The firms are initially identical and pursue the same strategy. However, since their investments succeed at random times, their stocks will soon differ. Because the strategic resources are complements, the firm with more of them will have stronger incentives to invest and will thus have a better than 50/50 chance of pulling further ahead. The differences between the firms will tend to grow over time and in the limit, they are almost surely different.

2 - A Theoretical Model on the Role of Marketing in Strategic Exits of Corporate Venture Capitalists

Manaswini Acharya, Research Scholar, Texas Tech University, Lubbock, TX
Mayukh Dass

Corporate Venture Capitalists (CVCs) are venture capital divisions of firms that directly invest in new start-ups to fulfill the firm's goals. As more and more firms are expanding their footprint over the past few decades, CVC investments have seen double-digit growth in the marketplace. However, like other investors, CVCs also frequently exit from their investments. Some of these exits are reactive to the changing market conditions, whereas other exits are proactive where CVCs plan investment exits as a part of the underlying strategy at the time of the investment, and we define them as strategic exits. In this paper, we use the theory-in-use approach and develop a theoretical model that examines the role of marketing in the strategic exit of CVCs. In particular, the paper first identifies the marketing factors related to the four categories, market governance, customer orientation, competitor orientation, and learning orientation, that may affect the strategic exits of the CVCs. Next, using in-depth interviews of fifty CVC's C-level managers, we identify a theoretical model and present related propositions that examine the propensity of strategic exit of CVCs. The model indicates the direct effect of CVC-venture partnership characteristics and the moderating effect of CVC, venture-specific characteristics, and the external characteristics on the CVCs' strategic exit decisions. Finally, we validate our model using inputs from a different set of C-level respondents and conclude by discussing the theoretical and managerial contributions of the study.

3 - Impact of Brand Activism on Polarization of Consumer Purchase Behavior and Consumer Portfolio Riskiness

Sayan Gupta, PhD student, University of Pittsburgh, Pittsburgh, PA

Vanitha Swaminathan

Brands' participation in socio-political activism (Bhagwat et al. 2020) could be double-edged interventions - garnering whole-hearted support from one end of the spectrum of consumers, while alienating customers from across the aisle. This study aims to demonstrate real-world implications of such brand actions using actual county-level purchase data of consumer brands aggregated from Nielsen Retail Scanner and Consumer Panel records, and then subjecting them to an event study analysis - i.e., by using a repository of brand activism announcements on traditional media as exogenous shocks to consumer markets (Bhagwat et al. 2020). Employing an analysis of market shares and their Recency-Frequency-Magnitude drivers in addition to consumer acquisition and attrition, the study quantifies the level of polarization infused within activist brands' consumer portfolios. To do so, we track these metrics at the county-level across a 15-year panel data and perform a generalized triple Diff-in-Diff event study analysis (Autor 2003; Currie et al. 2015) to estimate how these are impacted vis-a-vis a matched control group of brands, and across counties with varying ideological and religious compositions (based on their voting patterns and Census data, as per Khan et al. 2013). Finally, the study quantifies the riskiness embedded in these divisive brand actions by analyzing their impact on overall consumer portfolio risk - by first classifying counties into deciles of varying levels of political alignment, then treating them as large contractual customers, and using their profitability means and coefficients of variation to compute customer beta and deviations from an efficient consumer asset portfolio (Tarasi et al. 2011).

TA09

Virtual Room 09
Advertising and Digital Content
Special Sessions
Chair: Georgios Zervas
University School of Management, Brookline, MA
Co-Chair: Pinar Yildirim
University of Pennsylvania, Philadelphia, PA
Co-Chair: Yufeng Huang
University of Rochester, Rochester, NY
Co-Chair: Kosuke Uetake
Yale School of Management, New Haven, CT, 06511-8978

1 - Online Advertising and Disinformation: Evidence from a Field Experiment on Executives

Ananya Sen, Carnegie Mellon University, Pittsburgh, PA
The predominant business model for digital media platforms relies on advertisements, placed automatically by programmatic ad networks. Several digital media platforms have faced accusations of failing to adequately curb the prevalence of harmful content such as misinformation, which is also sustained by advertising. For every $2.16 in digital ad revenue sent to legitimate newspapers, U.S. advertisers send $1 to misinformation websites. With this background, we ask the following research questions: Does providing information about the prevalence of the ad funded misinformation change managers' demand for a solution to avoid placing ads on misinformation online? What motivates managers to address the issue of ad-funded misinformation? We aim to carry out an information experiment with executives who enrolled in a variety of Stanford Exec Ed programs as well as marketing managers based on several partnerships. We partner with NewsGuard to get detailed data on the extent of misinformation on thousands of news websites. We partner with Oracle to get the most comprehensive information on online ad prevalence of companies. The survey experiment will elicit prior beliefs of managers about the prevalence of misinformation online. It will then randomly provide a treatment to a random subsample providing them with more precise information about the magnitude of the problem. After that, we will elicit posterior beliefs as well as their WTP for tailored information about avoiding ad placement on misinformation websites. This would include details about whether their company's ads have appeared on misinformation websites and how they can avoid doing so. Next, we re-randomize the individuals to understand their motivations. The focus will be on a social condition that will highlight the social consequences of misinformation (eg. vaccine misinformation) while the monetary condition will highlight how investors of companies have reacted negatively when there has been media coverage about companies placing their ads on misinformation websites.

2 - The Effect of Ads on Search: An Experimental Approach

Ilya Morozov, Northwestern University, Evanston, IL
Anna Tuchman
We study how display advertisements in online retail affect the way consumers search for products and make purchase decisions. To this end, we design a simulated online book store that imitates the shopping experience of real online book stores. We populate this store with strategically selected books and design it so that consumers can examine the product list, visit product pages, and place orders just like they would normally do when shopping online. We then conduct an incentive-compatible advertising experiment in which we let participants shop in our book store while randomly exposing some of them to advertising banners of specific books. By monitoring their search activity and documenting final choices, we collect highly detailed consumer search data. Using these search data, we then empirically study whether and how display advertising works by testing several hypotheses that have been put forth in the theoretical consumer search literature.

3 - Information Provision by Video Influencers: Do Twitch Streamers Bring Viewers into Gaming?

Yufeng Huang, University of Rochester, Rochester, NY
Ilya Morozov
Influencer marketing has grown into a giant multi-billion-dollar industry. Yet, there has been little empirical work trying to estimate how influencer promotions affect the demand of products that they promote. In this paper, we study the effectiveness of influencer marketing in the video game industry. We construct a novel high-frequency dataset on video game streaming by continuously monitoring Twitch.tv, the largest gaming platform in the world, for half a year. We first estimate how broadcasts of popular Twitch streamers influence the short-term popularity of the broadcasted games. Although streamers strategically choose which games to stream, the exact times when they start and end their streams may vary from day to day for reasons unrelated to game popularity. Leveraging this plausibly exogenous within-day variation, we estimate the causal effect of Twitch streaming on the number of people playing the broadcasted game. Our results suggest that Twitch streams bring a substantial number of players into games, although the strong initial effect dissipates within 10 hours after the stream. Using a generalized random forest model, we estimate heterogeneous streaming effects as a function of observable game characteristics. Our results show that streaming has the largest effects on games from unknown developers and games with horizontal characteristics, on which consumer tastes differ, suggesting that Twitch streams convey information about the broadcasted game.

4 - Does the Content of Managerial Responses to Consumer Reviews Affect Consumer Behavior?

Surya Ierokomos, Stanford University, Stanford, CA
Sridhar Narayanan, Georgios Zervas
Online review platforms such as Yelp and TripAdvisor have seen tremendous usage growth in recent years. Consumers rely on these platforms to provide them information about businesses they are considering in industries such as hospitality, retail, and a variety of service industries. Many of these platforms allow businesses to respond to consumer reviews, and these responses are typically

visible to subsequent visitors to the platform. A nascent literature in marketing has explored the impact of whether businesses respond to consumer reviews on subsequent consumer evaluations. In this paper, we explore the impact of the content of managerial responses to hotel reviews on evaluations by subsequent visitors to the review platform. We develop a unique identification strategy that exploits the quasi-random allocations of responses to respondents in businesses with more than one respondent. We find that, on average, tailored and objective responses with a positive tone lead to higher subsequent star ratings. Furthermore, these more positive reviews tend to focus on service related aspects of the stay, as opposed to the infrastructure or location of the hotel.

TA10

Virtual Room 10
Online Consumer Privacy I
Special Sessions
Chair: Klaus Miller
HEC Paris, Jouy-en-Josas, France
Co-Chair: Bernd Skiera
Goethe University Frankfurt, Frankfurt, Germany

1 - Regulatory Spillovers and Data Governance: Evidence from the GDPR
Michail Batikas, LMU Munich, Munich, Germany
Christian Peukert, Tobias Kretschmer, Stefan Bechtold
We document short-run changes in websites and the web technology industry with the introduction of the GDPR. We follow more than 110,000 websites for twelve months before and six months after the GDPR became effective and show that websites substantially reduced their interactions with web technology providers. We further document an increase in market concentration in web technology services. Our findings contribute to the discussion on how regulating privacy impacts data minimization, competition, and market structure.

2 - Navigating Marketing Analytics Governance: Scope and Boundary Conditions of Data Protection Officers' Self-accountability
Christelle Aubert Hassouni, ESCP Business School, Paris, France
Julien Cloarec
Marketing analytics governance is the core of data-driven companies. The advent of General Data Protection Regulation (GDPR) disrupts this activity and gives Data Protection Officers (DPOs) a broader role in privacy protection. Based

on self-discrepancy theory, our survey (n = 226) show that DPOs' self-efficacy weakens the positive effect of their self-accountability on their behavioral intentions (i.e., protecting consumer privacy and complying with GDPR).

3 - When Apps Ask to Track
Michelle Andrews, Emory University, Atlanta, GA
Kyeongbin Kim, David A Schweidel
We leverage a recent change to the iOS mobile operating system that requires apps to request users' permission to collect their tracking data. We use location data from more than 7 million devices to examine the impact of the change. We find the frequency of data collection is reduced and the distribution of locations at which devices are detected shifts, suggesting a possible bias in future data collected. Though the policy change reduces the data that providers collect, we show how this can be addressed by using unaffected individuals to infer the behavior of affected individuals. We derive implications for future research on privacy.

4 - The Impact of the General Data Protection Regulation (GDPR) on Online Tracking
Karlo Lukic, Goethe University Frankfurt, Frankfurt, Germany
Klaus Miller, Bernd Skiera
We determine whether GDPR's enforcement increased users' online privacy by decreasing the quantity and intensity of online tracking. We exploit a difference-in-differences design to evaluate the effect of GDPR's enforcement using a balanced panel of 713 websites visited by 5 million EU and US users browsing 2.6 billion web pages of these websites between April 2018 and December 2019. We reveal that the quantity of online tracking, measured by the number of trackers and tracker providers, increased over time; websites that comply with GDPR use 19 trackers (12 tracker providers) on average in the entire post-GDPR period. Without GDPR, they would have used 21 trackers (13 tracker providers). We show that the intensity of online tracking, measured by the share of tracked web pages per site and the amount of user data transferred per tracker, decreased over time; websites that have to comply with GDPR track 26% of web pages on average in the entire post-GDPR period (3MB of user data transferred per tracker). Without GDPR, they would have tracked 29% of web pages (4MB of user data transferred per tracker). So, GDPR's enforcement decreased the average number of trackers on each website by 2 trackers or -9% (1 tracker provider or -9%) and the average share of tracked pages per site by 3 percentage points (1MB of user data transferred per tracker), having a minor positive impact on users' online privacy. We find that the enforcement of the law decreased advertising, analytics, and essential trackers on business, entertainment, and news sites - emphasizing a

minor positive impact on users' privacy. We conclude that the GDPR's enforcement increased users' privacy to a small extent. However, the overall increasing trend of the quantity of online tracking after the introduction of the GDPR poses a justifiable privacy concern for users.

TA11

Virtual Room 11
Algorithmic Fairness
Special Sessions
Chair: Rafael Becerril Arreola
USC Darla Moore School of Business, USC Darla Moore School of Business, Columbia, SC, 29208,

1 - The Cost of Fairness in Personalized Policies

Ayelet Israeli, Harvard Business School, Boston, MA
Eva Ascarza

Algorithmic personalization allows decision makers to design interventions at a high level of precision, which benefits both decision makes and consumers. For example, in the context of online advertising, personalization helps firms become more efficient in their resource allocation (e.g., serving ads to those consumers who are most likely to engage with the product) and helps consumers receive ads that are most relevant to them. However, algorithmic personalization also poses risks to society by disproportionately targeting individuals from certain groups (or protected attributes such as gender or race) - generally referred as group fairness -- or producing disparate outcomes for individuals who are identical except for their protected attributes - generally referred as individual fairness. Decision makers are increasingly concerned about potential unfairness of their algorithms and are encouraged to implement solutions that could potentially mitigate bias and unfair outcomes. However, adding fairness constraints to an algorithm would naturally reduce its efficiency, creating a tradeoff that is difficult for managers to assess: how much efficiency would be sacrificed to ensure more fair outcomes? In this paper we quantify this tradeoff by empirically measuring the cost (i.e., the loss in efficiency) of ensuring individual and group fairness. To do so, we analyze algorithmic predictions in real world data across multiple contexts, including credit card defaults, marketing messaging recommendations, and income predictions using Census data."

2 - Economic Models of Algorithmic Fairness

Bo Cowgill, Columbia University, New York, NY

We present perspectives on algorithmic fairness from microeconomics. We highlight the distinction between biased algorithmic predictions and biased algorithmic objectives. We conclude by discussing economic issues in policy policy and managerial practices around reducing algorithmic unfairness.

3 - An Empirical Investigation of Whether Algorithmic Pricing induces Disparate Impact in Online Retailing

Rafael Becerril Arreola, University of South Carolina, Columbia, SC

This work investigates the presence and nature of disparate impact in online retailing. A custom-built auditing platform collected price data from a major online retailer, including 20,000 different grocery products at more than 7,000 randomly-selected zip codes in the continental . Prices were then matched to consumer demographic data from the U.S. census and IRS. The data collected indicates that prices are higher for zip codes with higher average income, larger proportions of low-income consumers, and larger proportions of minority consumers. Most results hold even without automated recommendations, but price steering induces somewhat different correlations between prices and demographics. The results do not seem to be explained by consumer demand, supply-side costs, nor price elasticities.

TA12

Virtual Room 12
Consumer Behavior I
Contributed Sessions
Chair: Caner Cesmeci
Istanbul Technical University, Turkey

1 - The Power of Nature: Exposure to Nature Increases Consumers' Waiting Patience

Sunxu Xu, Renmin University of China, Beijing, China
Ying Ding

Despite the ubiquitous presence of waiting in consumption situations, little research attention has been given to the environmental factors that might influence consumers' waiting patience. In the current research, we aim to investigate the influence of exposure to nature on consumers' waiting patience when the chosen alternative is temporarily unavailable. Building on the extant literature, we propose that exposure to nature can increase consumers' feeling of relaxation when confronted with waiting, which allows them to shift their attention away from the passage of time. Consequently, the waiting time seems to pass quickly and consumers will exhibit greater waiting patience. We first

run a field experiment to demonstrate that exposure to nature can lead consumers to wait longer for the chosen alternative and have a higher willingness to wait (Study 1, N = 214). Study 2 (N = 204) explores the underlying process and the results show that the proposed effect is sequentially mediated by relaxation and the estimated speed of waiting time passage. Moreover, we explore the moderating role of perceived future time limitation in Study 3 (N = 360). As predicted, for consumers with a low perceived future time limitation, exposure to nature can significantly increase their waiting patience; however, the effect of exposure to nature is mitigated for consumers with a high perceived future time limitation. Our findings advance the existing research by introducing exposure to nature as a novel environmental factor of waiting patience. Managerially, to increase consumers' waiting patience, marketers can add natural elements to the marketing environments, for example, pot plants and nature sounds.

2 - Exploring Consumers' Need to Own

Richard Chau, Doctoral Student, Pepperdine University Graziadio Business School, Malibu, CA
Joy L. Shields, Doreen E. Shanahan, Cristel A. Russell

This project advances a nomological network and embarks on scale development to better capture the definition and dimensionality of the 'need to own' construct. Although some predicted the End of Ownership (Perzanowski and Schultz 2017), research suggests there are systematic individual differences such as intelligence (Aspara and Wittkowski 2019) that may drive consumers toward more liquid forms of consumption. Or, having a strong sense that something is mine increases consumers' territorial tendencies (Kirk, Peck, and Swain 2018). Research on deownership orientation shows that some individuals are more willing to rent or lend than to own (Lindblom and Lindblom 2016). Yet, consumers with high deownership orientation are more likely to have compulsive and impulsive digital acquisition tendencies (Koklic, Kukar-Kinney, and Vida 2022). Hence, as Lamberton and Goldsmith (2020) suggest, there may be innate antecedents of tendencies toward solid ownership. Following the 21st century's regained enthusiasm for the study of basic psychological needs (Vansteenkiste, Ryan, and Soenens 2020), we explore whether a trait-like disposition such as 'need to own' may transcend existing notions of materialism and whether consumers vary in their tendencies to be the sole owner of tangible or digital objects. The first phase of our study included qualitative interviews with consumer dyads, people in a relationship. We constructed a deep nomological network for how consumers' 'need to own' relates to other central constructs at the intersection of possessing/owning and liquid/solid. The second phase will be the item generation and testing phase followed by a series of studies designed to assess the reliability and validity of the newly developed measure.

3 - Life Transitions Enhance Receptivity to Sustainability Behaviors

Yandou Lu, Virginia Tech, Blacksburg, VA
, Dipankar Chakravarti

Although appeals for environment-friendly and sustainable consumption behaviors rarely meet overt opposition, motivating consumers to adopt and maintain sustainability behaviors is an ongoing challenge. Our research aims to identify triggering cues that create consumer mindsets that are attuned to being more receptive to implementing (and maintaining) sustainability behaviors.Life transitions, whether temporal (e.g., a birthday or a new year), locational (e.g., a new home or a new office), personal (e.g., marriage, family additions), or professional (e.g., graduation, or a new job) involve discontinuities that create opportunities to revisit prior habits and behaviors and adopting new ones (Verplanken & Roy 2016). Whether positive or negative, such transitions create life-script changes that may place individuals in a fresh-start mindset (Price et al. 2018) where they may be more receptive to new goals and lifestyles that are consistent with self-transformation.We propose and empirically test the idea that consumers may be more receptive to propositions advocating the adoption of new sustainability behaviors (e.g., recycling, energy conservation, food habits) in the presence (versus absence) of a salient transition cue (temporal, locational, etc.). This facilitates the adoption of the advocated behavior even in the face of serious incremental cost and/or effort penalties. We further argue that such adoption is mediated by a self-generated fresh-start mindset that is triggered by the transition. We also propose and show that if the behavior is promoted and as a default option (Jachimowicz et al, 2019), the behavior change may be more enduring. Our findings have significant implications for policymakers interested in instilling pro-sustainability consumer behaviors.

4 - Aggregate Review Metrics vs. Individual Reviews: How do They Affect Risk Perception and Product Judgment?

Caner Cesmeci, Istanbul Technical University, Istanbul, Turkey
Sebnem Burnaz

This research examines how consumers use aggregate review metrics (ARM) (e.g., average ratings) and individual reviews (IR) (e.g., review texts) to estimate the risk perception and make a judgment about a product. First, we provide a novel conceptualization of ARM as a base rate cue, consisting of

abstract, aggregated, category-level, and pallid elements; likewise, IR as a case information cue, consisting of concrete, idiosyncratic, and vivid elements. In this sense, drawing on construal level theory, we suggest that consumers' reliance on ARM (IR) will be enhanced (weakened) by psychological distance. The research includes two studies. First, a list of elements that influence relative importance of the cue types (i.e., ARM vs. IR) on consumer decision-making is compiled using the critical incident technique. Then, to test our hypothesis, an experimental study is designed. Psychological distance is manipulated via two scenarios signaling a purchase for self vs. others. Overall, the findings provide initial evidence that consumers' utilization of IR (ARM) is increased (decreased) when purchasing a product for themselves. Contrarily, consumers' utilization of ARM (IR) is increased (decreased) when purchasing a product for others. To the best of our knowledge, this is the first conceptual and empirical study that investigates relative importance of ARM and IR on perceived risk and product judgment in light of construal level theory. Early findings contribute to the existing literature of eWOM and construal level theory, as well as provide novel insights for managers as to prioritization of cue types (i.e., ARM vs. IR) in line with psychological distance of consumers.

TA13

Virtual Room 13
Online Reviews and User-Generated Content
Special Sessions
Chair: Andreas Bayerl
University of Mannheim

1 - Dynamic Triggering Effects for Online Content: A Bayesian Nonparametric Approach

Yang Li, Cheung Kong Graduate School of Business (CKGSB), Beijing, 100738, China, yangli@ckgsb.edu.cn
Jinnan Huang, Jiapeng Liu, Xiuwu Liao
Internet users exhibit diverse and evolving interest in online content creation (e.g., post and comment) and consumption (e.g., read, upvote, and repost). Earlier discussion of certain topics may trigger discussion of other topics in the near future. To understand the evolving mutual influences between different user-generated contents over time, we develop a novel Bayesian nonparametric topic model that integrates mutually exciting point processes (MEPP) with Indian buffet processes (IBP). While the MEPP considers the presence of topics as dependent stochastic events in continuous time, the nonparametric IBP flexibly accommodates diverse latent triggering factors within the MEPP. We apply the integrated model to content data collected from Quora, a well-known

online Q&A community, where new topics are often follow-ups of previous discussion. We use sequential Monte Carlo to efficiently estimate the nonparametric model. The results show that our proposed model can not only produce meaningful topics, but also uncover dynamic triggering patterns between topics over time.

2 - Pride and Prejudice in Online Reviews

Leif Brandes, University of Lucerne, Luzern, 6005, Switzerland, leif.brandes@unilu.ch
Online reviews for hotels are among the most frequently read types of online reviews. A common feature of hotels is that they bring together travelers with different nationalities and from different cultural backgrounds. Such cultural differences may give rise to misunderstandings and stereotypes. In this paper, we use a large sample of hotel bookings and online reviews and investigate to what extent such stereotypes exist in real online reviews. Based on research in social psychology and politics, we first define national stereotypes as statements that represent generalizations - both positive and negative - of individuals' attitudes and behavior, based on these individuals' nationality alone. Using a training sample of 1,500 annotated review sentences, we then use state-of-the-art machine learning techniques to classify an additional sample of 10,000 sentences which contain the mentioning of a nationality. These findings revealed that around 25% of these sentences included at least one national stereotype. Motivated by this result, we then investigate the antecedents and consequences of such national stereotypes in online reviews.

3 - Consumer Word-of-Mouth and Social Hierarchies: How Recipient Rank Influences Message Valence

Chris du Plessis, Assistant Professor, Singapore Management University, Singapore
David Dubois
This research investigates how recipient rank—whether a word-of-mouth (WOM) recipient is ranked lower, equal to, or higher than the WOM sender—influences WOM valence. We propose that WOM senders are less motivated to affiliate with lower-rank (vs. higher- or equal-rank) WOM recipients and thus share less positive information with these recipients. We tested the recipient rank effect in diverse WOM contexts, including real interactions with economic consequences. Seven experiments (n = 3,666) show that the recipient rank effect is (a) mediated by the affiliation motivation, (b) is attenuated among WOM senders with low self-monitoring motivation, which reflects low sensitivity to affiliation cues, and (c) disappears when the recipient is explicitly an in-group (vs. out-group) member. We rule out

four alternative explanations: differential product selection, perceived responsibility, role expectations, and reputational concern. Finally, we test a simple intervention for marketers: the negative effect of recipient rank on WOM valence disappears when WOM senders are encouraged to bond with the WOM recipient. Taken together, this work sheds new light on the impact of audience characteristics on WOM valence, elucidates why, how, and when recipient rank influences WOM valence, and offers actionable implications for managers for recruiting WOM advocates.

4 - Online Employer Reviews - On the Interplay Between Money and Workplace Vibes

Andreas Bayerl, University of Mannheim, Mannheim, Germany

Jacob Goldenberg, Danny Shapira, Florian Stahl

In this paper we study the newly emergent type of user-generated content platforms that collect and share employee-generated content (EGC) about companies, with the goal of helping job seekers find a job and company they love (Glassdoor 2021). In particular, we examine online employer reviews from two perspectives. First, from the perspective of someone writing and sharing a review (employee perspective), we show that a company's workplace vibes have a greater impact on employees' workplace recommendations than salary. This finding is most pronounced for employees in relatively well-paid jobs. We find that above a certain threshold, higher salaries are even associated with a decreasing likelihood to recommend the employer. This counter-intuitive result concerning high salaries is due to a personal cost-benefit tradeoff that develops unfavorably towards the personal costs and against the personal benefits of additional salary. Second, from the perspective of someone who is searching for an ideal job and considering employer reviews in his/her decision to apply for available positions in a company (job seeker perspective), we document that EGC is able to capture good vibes at companies and make them apparent to the outside world. As a result, companies can benefit from having good online employer reviews through a higher likelihood of filling an open position, a decreased likelihood that candidates reject an offer, and the possibility to pay less while applicants still accept a job with the same likelihood.

TA14

Virtual Room 14
Advances in Bayesian Modeling and Computation: Learning Preferences
Special Sessions

Chair: Ryan Dew
University of Pennsylvania, Philadelphia, PA
Co-Chair: Nicolas Padilla
London Business School, London, United Kingdom

1 - Preference Measurement with Unstructured Data, with Applications to Adaptive Onboarding Surveys

Ryan Dew, University of Pennsylvania, Philadelphia, PA

A common problem in recommendation systems is the cold start problem: how can we make a recommendation to a new customer, without any prior purchase data? Such problems are particularly salient for increasingly common online subscription businesses, where initial recommendations can shape whether potential customers decide to subscribe, and how their preferences evolve subsequently. The need to assess a new customers' preferences quickly, and without prior purchase data, has led to the increasing prevalence of customer on-boarding surveys, wherein companies ask potential or current customers a series of questions aimed at understanding their preferences, without having observed any purchasing. While such on-boarding surveys are a relatively recent development in e-commerce, the idea of learning the most information about a customer's preferences as possible using the fewest questions has been studied extensively in offline marketing research, in the context of adaptive conjoint analysis. In this work, we bridge these two domains using a combination of representation learning for unstructured data, and Bayesian optimization for on-the-fly estimation of preferences. We apply this framework both in the context of an on-boarding survey for an online subscription business, and in the context of traditional preference measurement.

2 - Relaxing Functional Form in Choice Models through Gaussian Processes

Samuel I. Levy, Carnegie Mellon University, Pittsburgh, PA

Richard Mirman, Alan Montgomery

Consumers change their choice as expenditures within a category increase. Traditional choice models usually make restrictive structural assumptions to specify the expenditure elasticity. This imposed functional form of utility strongly influences the range of estimable substitution patterns across goods. Consumers with highly nonlinear preferences may have consumption thresholds in which buying patterns dramatically change when price or budget changes. Understanding these thresholds with a flexible utility-based model could lead to improved pricing and promotion decisions. Using Gaussian process priors on utility functions, we relax the functional form of both inside goods and outside good, within the context of constrained utility maximization. We estimate a general direct utility choice

model for simultaneous purchases within a product category. We build a hierarchical model by borrowing information from a parametric functional form that constitutes an informative prior at the individual level. Our model captures non-linear rates of satiation and precise baseline preferences that traditional non-homothetic parametric models fail to capture by assuming a given functional form of utility. The proposed model automatically detects non-linear patterns of consumption from the data and provide a more precise statistical inference.

3 - Response Time in Choice-Based Conjoint: A Non-Parametric Approach

Hongjun Ye, Clarkson University, Potsdam, NY
Zhiya Zuo, Elea McDonnell Feit

In a choice-based conjoint study, researchers infer consumers' preferences for product attributes based on a series of hypothetical product choices. It has been shown that response time for these choices is also informative of consumers' preferences. However, previous approaches impose strict assumptions on how response time is related to choices and preferences, which may lead to bias in estimates of the preferences. We propose a model for response time and choice that flexibly relates response time to four features of the choice task -- question number, average attractiveness of the alternatives, difference in utility between the alternatives and importance-weighted attribute differences -- using a Gaussian process. We fit the model with data from a conjoint survey, which allows us to visualize the nonlinear multi-dimensional relationship between response time and the four features. We confirm prior findings that response time is related to the utility difference between alternatives and empirically show that response time is associated with the importance-weighted attribute differences between alternatives. The model estimated using response time predicts choice better than one fitted without response time. We discuss how the model can be used to improve conjoint practice and extend our understanding of response time and choice mechanism.

Thursday, 10:15–11:15am

TB01

Virtual Room 01
Game Theory I
Contributed Sessions
Chair: Yogesh V Joshi
University of Maryland, College Park, MD

1 - Artificial Intelligence on Call: The Physician's Decision of Whether to use AI in Clinical Practice

Shubhranshu Singh, Johns Hopkins University, Baltimore, MD
Tinglong Dai

Physicians are increasingly able to use artificial intelligence (AI) systems to aid their medical decision-making. This paper examines a physician's decision regarding whether to use an assistive AI system when prescribing a treatment plan for a patient. Using AI helps the physician generate an informative signal that lessens clinical uncertainty. It can also change the physician's legal liability in the event of patient harm. We analyze two patient-protection schemes that determine physician liability when using AI: the prevailing patient-protection scheme uses the AI signal to enforce the current standard of care, whereas an emerging scheme proposes using the AI signal as the new standard of care. We show that in both schemes, the physician has an incentive to use AI in low-uncertainty scenarios, even if AI provides little value. Furthermore, the physician may avoid using AI in higher-uncertainty scenarios where AI could have aided in better decision-making. As AI becomes more precise, the physician may become more hesitant to use it on certain patients. A comparison of the physician's decision to use AI under the two schemes reveals that using the AI signal as the new standard of care may mitigate AI underuse (overuse) for certain patients but may boost AI underuse (overuse) for some other patients.

2 - Behavior-Based Pricing under Nontransparent Pricing

Xi Li, University of Hong Kong, Hong Kong, China

Firms frequently collect consumers' purchase history data for behavior-based pricing (BBP), the business practice of offering personalized prices to each of their consumers according to their purchase histories. Extant literature has studied BBP under the assumption that prices are transparent, i.e., the price that a firm offers to a consumer is observed by other firms and consumers. In practice, firms often offer each consumer an individualized price (e.g., through personalized mobile coupons) without it being observed by other firms or consumers. In this paper, we study the effect of BBP when prices are non-transparent to market participants other than the offering firm and the receiving consumer. We find that, when prices are non-transparent, BBP intensifies price competition in both periods, thereby eroding firm profits significantly. This finding suggests that BBP's intensification of price competition may be more pronounced than previously known. Comparing the cases in which prices are transparent and non-transparent, we find that price transparency

improves firm profits but hurts consumer surplus. This result cautions public policymakers that practices that improve price transparency (e.g., data exchange between firms) can ultimately backfire on consumers.

3 - Co-creation in New Product Development: Collaborating with the Competitor in the Presence of a Shared Supplier

Abhishek Roy, Temple University, Fox School of Business, Philadelphia, PA, , abhishek.roy@temple.edu

The increasing complexity of technology has resulted in the emergence of a few key suppliers, and new product development has become a complex endeavor. Consequently, firms are increasingly involving their suppliers in co-creating new products and services through collaborative alliances. In many industries, such suppliers are shared by competing manufacturers. In such industries, competing manufacturers may benefit from forming alliances and co-creating new products jointly with their shared suppliers. Using a game theoretic model, we analyze the strategic interactions in such a collaborative alliance and examine the strategic trade-offs that arise when competing buyers decide to co-create a common component with the supplier, instead of relying on the supplier to independently develop the component. Our research highlights several interesting results. First, we show that in an industry where a few key suppliers are common to most buyers or manufacturers, such in the smartphone and electric vehicle industries, and the quality of the common component is critical to consumer demand, collaborative design processes improve the quality of the shared component produced by the common supplier. Furthermore, as consumers attach more value to the quality of the shared component, the quality of the component increases as more firms participate in the co-design process. Conversely, when consumers do not value the quality of the component highly enough, a collaborative endeavor to co-design the component may backfire. Additionally, whether the quality of the component will increase by involving more firms in co-design depends on other market conditions, such as the firms' costs of exerting effort, and the direct and indirect price sensitivities of the consumers.

4 - Public Private Product Design

Yogesh V Joshi, University of Maryland, College Park, MD
Shubhranshu Singh

Certain consumption contexts involve the design of products which can be fairly resource intensive to produce. In such contexts, it is common to observe public institutions such as governments make substantial investments required for designing products that improve social welfare. In these environments, it is also not uncommon to observe the presence of private institutions that leverage these substantial investments in order to design products that generate profits. We model such public-private interactions and analyze the implications of these interactions on product design in such consumption contexts. We find that the presence of private institutions does not always lead to enhancements in product quality. There exist market conditions under which the public and private entities co-exist to enable better product designs that lead to higher social welfare. However, public-private interactions in product design are not always socially beneficial: we also find that under certain constraints, the presence of a private institution can lead to product designs that reduce welfare.

TB02

Virtual Room 02
Behavioral IO: Theory and Evidence I
Contributed Sessions
Chair: Walter Zhang
University of Chicago

1 - An Information-Processing Theory of Loss Aversion

J. Miguel Villas-Boas, University of California, Berkeley, CA

This paper considers a model where a risk-neutral decision-maker receives both a signal about whether an outcome is above a certain threshold (a reference point) and a signal on the value of the outcome. Given these two signals, the expected value function of the outcome exhibits diminishing sensitivities both above and below the reference point. Furthermore, in the examples considered loss aversion occurs if the reference point is not too high. The paper shows how the informativeness of each signal affects the declining sensitivities and loss aversion effects, and reduces to risk-neutral decision-making when the signal on the value of outcome is perfectly informative. The loss aversion effects occur for low reference points because of the signal on the value of the outcome, and because the decision-maker may pay greater attention to the less likely low outcomes.

2 - Categorization Meets Prospect Theory: Distorted Perceptions of Probabilities and Outcomes Crossing Categorical Boundaries

Alina Ferecatu, RSM Erasmus University, Rotterdam, Netherlands
Dan Schley

We investigate the impact of numerical categorisation on Prospect Theory. Prospect Theory models how people distort objective probabilities and outcomes, and documents behavioral regularities such as diminishing sensitivity to increasing outcomes (the value function), a tendency to overweight low probability events, and a tendency to underweight high probability events (the probability weighting function). When describing a prospect, which is a combination of an outcome and its probability of occurrence, objective values and probabilities are often represented numerically, therefore additional distortion may arise due to how people encode and categorize these numbers. One example of such categorization is the well-documented left-digit effect, which is a tendency to focus on the leftmost digit of a number and not pay sufficient attention to the remaining digits. For instance, an objective value of 435 tends to be underestimated, and seen as 400 and something. The left-digit bias is present in various context, including pricing (e.g., 99-cent pricing). We demonstrate that this categorization effect is present when people evaluate both outcomes and probabilities of prospects, leading to additional distortion in both the value and the probability weighting functions. We build and validate a categorization-based Prospect Theory model, integrating models of left-digit bias (DellaVigna 2009, Lacetera et al. 2012, Strulov-Shlain 2021) and the Prospect Theory model. We document an increased sensitivity to changes in subjective values and probability weights when crossing categorical boundaries, leading to discontinuous jumps in values and weights. As next steps, we plan to validate our model on multiple data sets spanning different literatures from finance, economics, and marketing.

3 - Nudging Misperceptions
Walter W. Zhang, University of Chicago Booth School of Business, Chicago, IL
Sanjog Misra

We propose a framework for welfare analysis of nudges when consumers hold potentially biased beliefs. We estimate a structural model of the influence of nudges on consumer beliefs and purchase decisions in the context of a large food delivery platform. We identify the model by combining panel data on consumer purchasing behavior with variation from a randomized field experiment that nudged consumers to purchase the platform's subscription service. Consumers make a repeated monthly decision on whether to renew this subscription service whose benefit depends on the consumers' expected consumption. Consumers hold biased beliefs if they make repeated subscription mistakes from an ex-post perspective. Nudges have a substantial effect on subscriptions as well as 90 day on-platform consumption. However, nudges have an ambiguous effect on consumer welfare as only some consumers are made better off by purchasing the subscription. We show how policy makers can leverage these heterogeneous treatment effects and the structural model to optimally target nudges in order to maximize consumer or producer surplus.

TB03

Virtual Room 03
Influencer Marketing II
Special Sessions
Co-Chair: Daniel Shapira
Guilford Glazer School of Business & Management, Beer Sheva, Israel
Chair: Andreas Lanz
HEC Paris, Paris, France

1 - Influence Corridors: A New Path to Seeding Targets on User-Generated Content Platforms
Andreas Lanz, HEC Paris, Paris, France
, Jacob Goldenberg, Daniel Shapira, Florian Stahl

On user-generated content platforms, individuals and firms alike seek to build and expand their follower base to increase the reach of the content they upload. This setting generally belongs to influencer marketing, where the bulk of the seeding literature suggests targeting users with a large following—the high-status influencers. In contrast, some recent studies find targeting low-status influencers to be a more effective seeding policy to build a follower base due to their higher responsiveness. We revisit these two opposing policies and investigate how social capital—the value embedded in the expanding follower base—can directly support seeding efforts. Based on the rationale that the follower base serves as an intermediary of group identity, we demonstrate in data-based simulations that using the first-degree followers as influence corridors to target the low-status second-degree followers—i.e., the connected low-status influencers—is much more effective than targeting (1) unconnected high-status influencers and (2) unconnected low-status influencers. We augment the empirical study on this friends of friends phenomenon with a pre-registered field experiment and thereby obtain convergent validity of our findings.

2 - Optimising Seeding Strategies by Incorporating Empirical Evidence into Influence Maximisation Models
Manuel Sebastian Mariani, University of Zurich, Zuerich, Switzerland
, Radu Tanase Jx Rene Algesheimer

The opportunity to capitalize on social contagion has led many firms to invest significant resources in modelling the diffusion of products in a social network and in identifying the best seeding strategies. While extensive literature has been devoted to addressing both topics, incorporating this knowledge to predict and engineer virality remains a difficult task. Recent findings show that many existing influence maximization models surprisingly fail to integrate empirical evidence, which leads to a biased estimation of the influence propagation and to a sub-optimal identification of the seed nodes.

In this article, we propose a framework to estimate the individual susceptibility to social influence from observed product choices and integrate it into modelling product diffusion. To illustrate the approach, we integrate the findings of a laboratory experiment with an agent-based model. In the experiment, we use a conjoint design to measure the individual susceptibility to social influence from observed product choices. We show that the mean individual threshold significantly correlates with the psychological measurement of susceptibility to social influence. We use the experimental results to calibrate a threshold model of product diffusion in a social network, where the thresholds are empirically estimated in the lab experiment. We find that using artificially generated thresholds can lead to a biased estimation of the influence propagation and quantify this effect. Furthermore, we propose a method to construct an optimal portfolio of seed nodes with an ordinary number of contacts, and show that it outperforms seeding high degree nodes.Overall, our findings shed light on the drivers of social contagion, establish a link between micro-level observations and macro-level outcomes, and provide insight into designing more effective viral marketing campaigns.

3 - The Path to Fame - Exploiting Curator Networks to Predict Human Brand Success

Daniel Winkler, University of Economics and Business-Vienna, Vienna, Austria
Nils Wlömert, Lev Muchnik, Jacob Goldenberg
On access-based music streaming services users are confronted with seemingly unlimited choice and content owners such as artists and music labels compete for the users´ limited time. To help consumers navigate, curated playlists have emerged as a new tool to influence demand. Despite their importance, the role of playlist curators in shaping demand is not well understood. On the one hand, curators base their decisions to include a song on their playlists on information about new songs before they become available and they may thus influence the trajectories of these songs. On the other hand, curators may select songs that are already successful and, hence, merely react to a song's positive trajectory. In this research, we develop a methodology

to determine the importance of playlist curators using a combination of machine learning methods and network analysis techniques. The model is trained on weekly curation information for a sample of 11,000 playlists over a period of more than one year. By placing each playlist in a latent space, we determine their centrality in a dynamic network of playlists at a given point in time. We then relate the aggregate weekly centrality scores to streaming data on the song-level for a sample of 182,000 songs. Our findings reveal that playlist centrality is the key determinant of a song's success and that playlist centrality is relatively more important than the number of playlist followers since large playlists tend to list songs once they have achieved a certain level of success. We further find that songs particularly benefit from influential playlists in an early stage of the product lifecycle and that the playlist effect is stronger for independent and long-tail artists, who are generally less likely to be discovered via other channels due to limited marketing budgets. The results are relevant for content publishers, whose investments in new talent are both costly and risky due to the low success rate in this market.

4 - Targeting Prospective Influencers on User-Generated Content Platforms

Daniel Shapira, Ben-Gurion University, Beer Sheva, Israel
Andreas Lanz, Jacob Goldenberg, Florian Stahl
Given the ubiquity of user-generated content platforms, endorsements by influencers have become an integral part of online communications. But excessive monetary compensations and existing contractual agreements of influencers limit the ability of many firms to engage in effective influencer seeding. We suggest a different approach, which is forward-looking: A manager can target prospective influencers—while they are still largely unknown (e.g., a few months after sign-up)—and sign them to endorse the firm in the far future (e.g., dozens of months after sign-up). This approach has the potential to significantly reduce costs. However, because of the inherent and extreme financial uncertainty (as only rarely do new sign-ups ultimately become influencers), we propose a novel framework to cope with this rare-event problem. The idea is to build on expected utility theory using a dynamic Bellman-like formalism to account for three managerial trade-offs: the present-future, risk-return, and gain-loss trade-offs. For empirical demonstration and application, we conduct data-based simulations using a dataset from SoundCloud in which we apply various prediction models (e.g., deep learning, extreme gradient boosting, logistic regression, and rare-event models by Firth (1993) as well as King and Zeng (2001a,b)).

TB04

Virtual Room 04
CRM II
Contributed Sessions
Chair: Sharmistha Sikdar
Dartmouth College, Hanover, NH

**1 - What Makes Customers Come Back? :
Satisfaction, Intention, and Retention in the
Casino Industry Pre Post COVID-19**
Sanghee Nina Kim, University of Iowa, Iowa City, IA
Thomas S Gruca

There is a growing body of evidence that customer satisfaction increases customer retention and retention drives firm performance. However, empirical studies of this relationship are generally limited to aggregate, firm-level analyses. The few studies that model individuals tend to focus on either the links between satisfaction and behavioral intentions or satisfaction and actual behavior. At the same time, satisfaction does not have a consistently positive effect on retention. This study reexamines the link between customer satisfaction and actual as mediated by behavioral intention, e.g., repurchase intention. Using individual customer levels of data from the casino industry, we establish the causal mechanisms among satisfaction, behavioral intention, and retention. This study extends the concept of retention beyond the usual binary view (Yes/No) by modeling changes in spending amount and recency versus customer history. These metrics provide managers with a better guideline for diagnosing and monitoring the effects of satisfaction on customer behaviors. Furthermore, the casino industry went through lockdown due to Covid-19 which allows us to examine the robustness of the relationships among satisfaction, intentions, and actual behaviors in the setting of a natural experiment. Our findings contribute to a better understanding of what factors drive customer retention, visit recency, and spending behavior.

**2 - The Impact of Feedback Touchpoints in the
Curated Subscription Box Industry**
Kihyun Hannah Kim, Rutgers Business School, Newark/
New Brunswick, NJ
Nita Umashankar, Thomas Reutterer

Curated subscription box services are booming. A key characteristic of these services is their multiple feedback touchpoints to garner continuous reactions and opinions from customers throughout the customer relationship. The customer feedback collected through multiple touchpoints offers box service firms the opportunity to learn about their customer experience and help box services encourage customers to repeatedly agree to receive a box and, upon doing so, buy the box's products. We use a unique dataset with customer purchase and feedback touchpoint histories from a national apparel subscription box service to examine the differential effects of feedback touchpoints on customers' future box order and spending decisions. We find that while soliciting feedback allows firms to learn about customers, the impact of customer feedback on customers' future purchase decisions is not always positive. Customers' willingness to provide comments may signal their cocreation efforts, positively affecting purchasing decisions. However, the effects of feedback touchpoints depend on the type, and the timing of feedback solicited. We believe the findings of this research will interest customer experience designers at subscription box service firms.

**3 - Creating More Successful Journeys by
Managing Holidays And Abandonment**
Sharmistha Sikdar, Assistant Professor, Dartmouth
College, Hanover, NH
Wayne Taylor, Scott Andrew Neslin, Wenyu Jiao

In online retailing, a typical customer journey involves several customer actions, e.g., clicks on firm-served marketing communications, customer directed organic search, followed by more complex browsing behavior and finally a decision to buy. As a result, some of these journeys result in a sale, while others are abandoned along the way. We introduce a third possibility, that the customer does not abandon the journey but takes a break or holiday from search and buy activities with the firm and returns at a later point to resume the journey and potentially buy. We use clickstream data from a large travel site to model the path to purchase, accounting for holidays. The data include impressions (ads), engagement (clicks), and conversions (any customer-generated behavior, such as site visits and sales confirmations). Using this empirical setting and latent constructs, our goal is to predict the next customer action, i.e., a visit, a sale, or inactivity. Furthermore, conditional upon the inactivity, we infer whether the customer has entered a period of holiday or whether the customer has indeed abandoned the journey. Predicting a customer action such as sale, journey abandonment or customer churn, and holiday is important for managers to determine the next best possible action, e.g., whether to serve an ad to the customer. Furthermore, evaluating the attribution of the outcome (sale or journey abandonment) to the past set of touchpoints and platforms is crucial for managers to examine which touchpoints are most likely to lead to a success, i.e., a sale.

TB05

Virtual Room 05
Search & Pricing & Mobile

Special Sessions
Chair: Georgios Zervas
Boston University School of Management, Boston
University School of Management, Brookline, MA,
02445-7610,
Co-Chair: Pinar Yildirim
University of Pennsylvania, Philadelphia, PA
Co-Chair: Yufeng Huang
University of Rochester, Rochester, NY
Co-Chair: Kosuke Uetake
Yale School of Management, New Haven, CT

1 - Search Routes in Mobile Commerce

Luna Zhang, University of Washington Tacoma,
Tacoma, WA
Elisabeth Honka, Yuliang Yao, Raluca Ursu

When shopping online for a product, consumers can reach a product list page via multiple routes: by going through a category page, by directly typing the product name in the search field, by going through a sale page, etc. Previous research has largely ignored how consumers choose between these routes and how, in turn, these routes affect which products consumers subsequently see, browse, and potentially purchase. Our novel data from a mobile shopping app contain detailed information on consumer browsing for sandals throughout the app over a time period of six months. We use an adapted version of the theoretical Greminger (2021) model to empirically examine how consumers choose a search route and how this choice affects browsing and purchase decisions.

2 - An Empirical Analysis of Optimal Nonlinear Pricing

Soheil Ghili, Yale University, New Haven, CT

In ``continuous choice" settings, consumers decide not only whether but also how much to purchase. As a result, firms should optimize a full price schedule rather than a single price point. This paper provides a methodology to empirically estimate the optimal schedule under multi-dimensional consumer heterogeneity. Preliminary results show that the optimal second-degree price discrimination (i.e., optimal nonlinear tariff) improves the firm's profit upon linear pricing by about 10\%. That said, this second-degree price discrimination scheme only recovers 10\% of the gap between the profitability of linear pricing (i.e., no price discrimination) and that of infeasible first degree price discrimination. We also conduct further counterfactual analysis to shed more light on the effects of different parameters on the shape of the optimal nonlinear price schedule.

3 - Promoting Physical Activity through Prosocial Incentives on Mobile Platforms

Yuan Yuan, Purdue University, West Lafayette, IN
Christos Nicolaides, Alex Pentland, Dean Eckles

Mobile devices and applications provide new opportunities to promote healthy physical activity. Existing applications and research trials have made use of financial, social, and prosocial incentives for physical activity. However, little is known about the effects of prosocial incentives in particular. Here we provide evidence on effects of prosocial incentives on promoting physical activity. In a field experiment with more than 40 million users on a giant social platform in Asia, we remind users to interact with a step donation feature that associates users' step counts with third party donations to charities; we estimate that interacting with this feature causes users to take over 1,000 additional steps in the short run. To supplement these experimental results, we further conduct matching on observational data to compare the effects of prosocial (step donation) and social incentives (via a feature where users may be encouraged by social comparisons of steps among friends), yielding evidence that the prosocial incentive may have larger effects in our setting. Finally, we discuss plausible prosocial motivations that drive step donation engagement and use a regression discontinuity design to identify users likely driven by warm glow giving. Overall, our study shows the potential of leveraging prosocial incentives to encourage physical activity and sheds light on possible further improvements on the design of prosocial incentives.

4 - Flexible Demand Estimation with Search Data

Stephan Seiler, Imperial College London, London,
United Kingdom
Tomomichi Amano, Andrew Rhodes

Traditional methods for estimating demand are not always well-suited to online markets, where individual products are sold infrequently, unobserved factors such as webpage layout drive substitution, and often only a limited set of product characteristics is observed. We propose a demand model where browsing data—which is abundant in many online settings— is used to infer individual consumers' consideration sets. In our model, the underlying variables which drive consideration can be correlated arbitrarily across products. We estimate the model through a constraint maximization approach, based on the insight that these correlations should rationalize the product-pair co-search frequencies that are observed in the data. In turn, these correlations make it possible to estimate more flexible substitution patterns. We apply the model to data from an online retailer, recover the elasticity matrix, and solve for optimal prices.

TB06

Virtual Room 06
Machine Learning and AI II
Special Sessions
Chair: Venkatesh Shankar
Texas A&M University, College Station, TX

1 - Identifying Influential Users by Topic in User-Generated Image Content

Mirai Igarashi, University of Tsukuba, Tokyo, Japan
Kunpeng Zhang, Pallassana K Kannan, Nobuhiko Terui
Social media users generate a variety of content which influence their followers' behavior and preferences. In this study, we develop an approach to determine influential users who have significant impact on other users' interest in the specific topics of user-generated image content. We propose a new variant of topic model with a hierarchical structure of vector auto-regressive model considering the evolution of topic distribution and the social influence among users on the levels of interest in content topics, extending the concepts of dynamic topic model and structural topi model. The methodology enables estimation of topic-specific influences from UGC data such that the social influence network varies across different topics. We not only identify the influential users for each topic of the content, but also illustrate the extent of the spillover of influence across topics. We apply the methodology to Pinterest data and show that the visualization of the estimated social influence on the network can provide insightful implications for social media marketing.

2 - Measuring and Mitigating Disintermediation on Two-sided Platforms: Insights from Airbnb and Location Big Data

Jinan Lin, University of California, Irvine, CA
Tingting Nian, Natasha Zhang Foutz
Two-sided online platforms, such as Airbnb and Freelancer, capture $40 billion onlinemarketplace. Nonetheless, disintermediation, where participants bypass platforms to transactdirectly, has challenged the business model and dwindled the profits of the platforms. Despiteexplicit and implicit mitigation strategies, little is known regarding the extent ofdisintermediation and differential efficacy of various mitigation policies. We present some of the first large-scale empirical evidence of disintermediation, quantify its magnitude, and evaluate the causal impacts of various mitigation policies. Analyses of the Airbnb occupancy data and population-scale individual-level location data, using geo-spatial analytics and other machine learning methods, reveal a 6.5% rate of disintermediation in Austin, TX during the Summer of 2019. Difference-in-Differences (DiD) analyses, augmented with matching, on four strategies suggest that Instant Bookable, which allows guests to book without requesting hosts' approval, is most effective, reducing disintermediation by 10%, followed by Airbnb Plus certificate (6%), which requires application fees for on-site property inspections. In contrast, the Superhost badge and information concealment create no impact on reducing disintermediation. Further Difference-in-Difference-in-Differences (DDD) analyses of the heterogeneous treatment effects suggest that, for instance, the impact of Instant Bookable on disintermediation is weaker for the hosts with a preference for long-term leases, whereas stronger for those with more repeated online customers. The findings offer important managerial guidance to platforms regarding their mitigation and innovation strategies.

3 - How Does Zestimate Affect Housing Market Outcomes Across Socio-economic Segments?

Runshan Fu, Carnegie Mellon University, Pittsburgh, PA
Yan Huang, Nitin Mehta, Param Vir Singh, Kannan Srinivasan
We study the impact of Zillow's Zestimate on housing market outcomes and how the impact differs across socio-economic segments. Zestimate is produced by a machine learning algorithm using large amounts of data and aims to be an unbiased prediction of a home's market value at any time. Zestimate can potentially help market participants in the housing market as identifying the value of a home is a non-trivial task. However, inaccurate Zestimate could also lead to incorrect belief about property values and hinder the selling process. Meanwhile, Zestimate tends to be significantly more accurate for rich neighborhoods than poor neighborhoods, raising concerns that the benefits of Zestimate accrue largely to the rich, widening socio-economic inequality. We build a structural model of a housing market where sellers and buyers face uncertainty about property values, and estimate the model on a unique dataset consisting of 3,724 properties listed in Pittsburgh between February and October 2019. The counterfactual analysis suggests that Zestimate benefits the housing market as on average it increases both buyer welfare and seller welfare. Moreover, Zestimate actually reduces socio-economic inequality, as our results reveal that both rich and poor neighborhoods benefit from Zestimate but the poor neighborhoods benefit more.

4 - The Impact of Consumer Mobility and Store Flux on Consumer Response to Geo-fenced Promotional Ads: A Deep Learning Approach

Sanjana Surange, Texas A&M University, College Station, TX

Venkatesh Shankar

Consumer mobility is reshaping advertising spending. The average American drives nearly 30 miles for about 59 minutes every day and makes purchase decisions based on their mobility. Accordingly, marketers' spending on location-based advertising is growing rapidly and is projected to reach $33 billion by 2023. Advertisers constantly seek a better understanding of how consumers' geo-location and activities in the spatio-temporal dimension (driving trajectory) impact their response to promotional ads and purchase decisions. Prior research has studied human mobility in the contexts of telecom network expansion, traffic management, urban planning, and healthcare outcomes. However, research on consumer driving trajectories and their impact on in-store purchases is sparse. We analyze the impact of store flux (density of consumer driving trajectories in a store vicinity) on consumer response to geo-fenced promotional ads and in-store purchases. Using a unique dataset comprising over 427,000 users of a popular mobile app for safe driving, we address two important research questions: (1) How does store flux influence geo-fenced promotional ad effectiveness and in-store purchases of consumers? and (2) What segments can be extracted from an analysis of the responses to geo-fenced promotional ads and purchases? We develop a human mobility model to extract the driving trajectories of app users and propose a framework to define consumer mobility and store flux. We then use sequential deep learning models to extract consumer lifestyle patterns using their driving trajectories. Using these lifestyle patterns and store flux, we explain and predict consumer response to geo-fenced ads and their in-store purchases. Our results demonstrate the incremental value of consumer mobility and driving trajectories (beyond demographics) in explaining and predicting consumer response to geo-fenced promotional ads and in-store purchases. They also help better identify consumer segments and make more fine-tuned targeting decisions.

TB07

Virtual Room 07
Data-driven and Machine Learning Methods in Marketing
Special Sessions
Chair: Dennis Zhang
Washington University in St Louis, St Louis, MO

1 - Estimating Parameters of Structural Models Using Neural Networks

Zhenling Jiang, University of Pennsylvania,

Philadelphia, PA
Yanhao Wei

Machine learning tools such as neural networks are increasingly applied in marketing and economics to learn complex relations in data. The learned relations allow machines to perform various tasks, such as recognizing objects from images or recognizing emotions from speech. This paper explores using a neural net to learn the relation between data (moments) and the parameter values of a structural economic model, so that it can recognize, or estimate, these parameter values from the data (moments). We train the neural net with the datasets generated by the structural model under different parameter values. The neural net can be trained to give not only the point estimates of parameters but also their statistical accuracy. We show this Neural Net Estimator (NNE) converges to meaningful and well-known limits when the number of training datasets is sufficiently large. NNE does not require computing integrals over the unobservables in the structural model. Thus, it is suitable for models where such integrals are costly in MLE/GMM. We benchmark NNE in two Monte Carlo studies. NNE is able to achieve high estimation accuracies under very light estimation costs.

2 - Choice Overload with Search Cost and Anticipated Regret: Theoretical Framework and Field Evidence

Xiaoyang Long, University of Wisconsin-Madison, Madison, WI
Jiankun Sun, Hengchen Dai, Dennis Zhang

As consumers are offered an ever-increasing number of options for almost every purchase decision in online retail, understanding the impact of assortment size on consumer choice decisions---especially on both search and purchase behavior---is critical. Our research speaks to this question by combining theoretical modeling with empirical analyses in an important online retail context: recommender systems. Specifically, via a large-scale field experiment involving 1.6 million consumers on an online retail platform, we causally examine how consumers' click and purchase behavior changes as the number of products in a recommendation set increases. We document that both the consumers' likelihood of making a purchase and their likelihood of starting a search (i.e., clicking on any of the products) first increase and then decrease as the number of options increases. We build a stylized two-stage model of consumers' search and purchase decisions and demonstrate that our empirical results are consistent with the predictions of a model that incorporates consumers' anticipated regret. We also discuss other proposed mechanisms of the choice overload effect in the literature and whether they can (or cannot) explain

our observed results. Altogether, this work presents real-world experimental evidence for the choice overload effect in the context of online recommender systems and provide prescriptive insights into when and how limiting the number of options may be beneficial to online retailers.

3 - Machine Learning Based Causal Inference with Multiple A/B Tests on Large-scale Platforms

Zikun Ye, UIUC, Urbana, IL
Dennis Zhang, Zhiqi Zhang, Heng Zhang, Renyu Zhang
We develop a new framework to estimate and infer the overall treatment effect of multiple experiments and identify the optimal experiment combination with partially observable outcomes. We propose a deep learning and semi-parametric statistics framework to estimate the HTE of any experiment combination for each user on the platform.

4 - Privacy-Preserving Dynamic Personalized Pricing with Demand Learning

Yining Wang, University of Florida, Gainesville, FL
Xi Chen, David Simchi-Levi
The prevalence of e-commerce has made detailed customers' personal information readily accessible to retailers, and this information has been widely used in pricing decisions. When involving personalized information, how to protect the privacy of such information becomes a critical issue in practice. In this paper, we consider a dynamic pricing problem over T time periods with an \emph{unknown} demand function of posted price and personalized information. At each time t, the retailer observes an arriving customer's personal information and offers a price. The customer then makes the purchase decision, which will be utilized by the retailer to learn the underlying demand function. There is potentially a serious privacy concern during this process: a third party agent might infer the personalized information and purchase decisions from price changes from the pricing system. Using the fundamental framework of differential privacy from computer science, we develop a privacy-preserving dynamic pricing policy, which tries to maximize the retailer revenue while avoiding information leakage of individual customer's information and purchasing decisions. To this end, we first introduce a notion of \emph{anticipating} differential privacy that is tailored to dynamic pricing problem. Our policy achieves both the privacy guarantee and the performance guarantee in terms of regret.

TB08

Virtual Room 08
Brand Equity and Advertising
Contributed Sessions

Chair: Anthony Koschmann
Eastern Michigan University, South Lyon, MI

1 - The 'Power Recovery Effect' of Women-offending Advertising

Enav Friedmann, Ben Gurion University, Beer Sheva, Israel
Merav Weiss Sidi
Ads that offend women are known to hinder women's short-term purchase intentions, but their effect on long-term purchase intentions has not been described. Here, using three studies, we examine the effect of such ads on both short- and long-term consumer responses, suggest an explanatory mechanism, and demonstrate how empowering women can buffer this effect. We found that those who felt highly discriminated against on account of their gender group (mostly women) demonstrated a power-recovery motivation toward the brand that offended them, increasing their purchase intentions over time so as to restore their diminished power. Empowering women buffered this effect and decreased purchase intentions, as compared with control ads.

2 - Uncovering Successful Narratives in Super Bowl Ads

Jongho Kim, PhD Student, Cornell University, Ithaca, NY
Khaled Boughanmi, Young-Hoon Park
Developing original and creative advertising is considered an art rather than a science. In this research, the authors propose a new framework to examine the impact of advertising narratives on advertising success. The framework consists of three steps: (1) dividing a narrative of advertising into a sequence of textual components, (2) identifying interpretable topics of the components using an Embedded Topic Model approach, and (3) assessing the impact of topical variations on advertising success. The authors illustrate the framework using a dataset on Super Bowl ads spanning a period of ten years. The findings highlight the importance of topical variations to advertising success and their heterogeneous effects across different industries. The authors discuss the implications on designing successful advertising narratives.

3 - Brand Equity and Channel Effects

Anthony Koschmann, Eastern Michigan University, Ypsilanti, MI
Kevin Lane Keller
Understanding brands and brand equity is a top priority for academics and practitioners alike. Marketers want to know how strong their brands are, and factors that enhance or detract from that strength. Towards that goal, academics have developed conceptual models and frameworks of brand equity (e.g., Aaker 1992; Keller 1993) while industry

practitioners have developed models of brand valuation (e.g., Interbrand; Millward-Brown). One particularly insightful approach has looked at the strength of brands from the perspective of revenue premiums (ALN: Ailawadi, Lehmann, and Neslin 2003). Indeed, ALN's focus of comparing brand revenues to those of private labels has produced much investigation into private label research and its impact on brands. However, while brand health is important for managers, an overlooked aspect is the role channels have in generating brand equity. This study investigates drivers of brand equity across four channels using nine years of consumer packaged good data in 882 categories. The authors find that asymmetrical effects occur not just across channels, but for brand leadership as well in being able to drive brand equity.

TB09

Virtual Room 09
Experimental Advertising
Contributed Sessions
Chair: Julian R.K. Raphael Klaus Wichmann
University of Cologne, Cologne, 50825, Germany

1 - Cookie Bias: The Flaws in Cookie Based Advertising Measurement

Min Tian, Ohio State University, Columbus, OH
Paul R Hoban, Neeraj Arora
We explore data from a randomized field experiment which is conducted at the cookie level, but we aggregate those effects up to the individual level. This presents opportunities such as allowing us to study carryover impact and spillover impact from the online ad campaign to offline. We use disaggregated data and the disaggregated model to disentangle those effects.

2 - Brands that use BAE: Does Slang Help Brands?

Bryce Pyrah, PhD Candidate, University of Iowa, Iowa City, IA
Alice Wang
With the popularity of social media, many brands use slang in their marketing communications to connect with their consumers on a personal level. Across five experiments, we find that the use of slang in marketing communications could have unintended negative consequences for brands. Brand messages tend to exhibit higher levels of formality and authority than consumer messages. Hence, the expectations consumers have for brand messages make the use of slang inappropriate in brand communications. However, these expectations are relaxed for consumer messages, making the use of slang acceptable in consumer communications. As a result, brand messages containing slang lead to less favorable brand attitudes and behaviors, whereas the same messages sent by consumers do not have such negative consequences. To further test our theory on expectancy violations as the mediator, we operationalized consumer expectations with brand personality. We show that, in messages from brands with a sincere personality, slang results in less favorable attitudes. However, when brands with an exciting personality use slang, the negative effect on brand attitudes disappears because consumers do not have the same expectations for brands that are exciting and rebellious.

3 - Effect of Brand Advertising on Purchase Funnel: Impact and Mechanism in the Messy Middle

Thyagarajan Subramanian, The University of Texas at Dallas, Richardson, TX
B.P.S. Murthi
In digital marketing, performance-based advertising is a dominant strategy as it relies on observable metrics such as cost per click and cost per action to allocate advertising budgets. These campaigns focus on information and call to action. In contrast, brand advertising uses television, outdoor, and other rich media. Brand advertising uses emotions, imagery, and symbolism for positioning. Both types of advertising can influence different stages of the consumer purchase funnel, from brand awareness, consideration, preference to its eventual purchase and repurchase. However, extant literature has not studied the effect of brand advertising on different stages of the observed purchase funnel. This study uses a unique data set from a natural experiment to learn how brand advertising affects different stages in a purchase funnel for a digital platform that provides app-based food delivery from local restaurants. We propose a conceptual model of how advertising impacts emotion-driven choice. First, we use regression discontinuity in time to measure the impact of brand advertising on the middle of the funnel - consideration and preference. Next, we use brand track surveys measuring changes in perception and a deep learning analysis of social media conversations to explain how advertising affects emotional preference building. This study is the first to show that brand advertising increases both consideration and preference by 10% and 12%, respectively, even after prolonged previous exposure to performance ads. We observe that a brand-building campaign is different in its effectiveness on various stages of the purchase funnel relative to performance advertising. This study will guide managers to select suitable campaign approaches for different stages of the consumer purchase funnel.

4 - Skippable and Non-skippable Ads - The Yin and Yang of Digital Video Advertising

Julian R. Wichmann, Assistant Professor, University of Cologne, Cologne, Germany

Digital video advertising (DVA) has become an integral part of modern advertising campaigns with ad budgets amounting to roughly two-thirds of TV ad spending (eMarketer 2021). An important and unique part of DVAs are skippable ads, which can be skipped by the press of a button but only after a minimum required time (usually five seconds). Skippable ads are adopted widely with 80% of marketers reporting to use this format (IAB Europe 2018).

Nonetheless, few studies to date have analyzed skippable ads and the majority focuses on antecedents of skipping (e.g., Belanche et al. 2017; Campbell et al. 2017; Jeon et al. 2019). A detailed understanding of the underlying processes and behavioral and attitudinal consequences of using skippable ads, however, is lacking. Hence, this study tackles the following research questions:1) How do skippable ads influence consumers' ad and brand perceptions?2) How should marketers design skippable ads to improve brand outcomes?3) How can marketers use skippable alongside non-skippable ads to improve performance of DVA campaigns?In three lab studies, typical online video viewing experiences are replicated. This allows to tightly control for confounding factors, precisely observe skipping behavior, and administer a comprehensive questionnaire uncovering underlying attitudinal processes.This study makes several important contributions. First, it is the first to uncover two opposing effects of skippable ads—while they lessen feelings of intrusiveness, they also significantly worsen ad enjoyment by disrupting the ad viewing experience. Second, this study demonstrates the relevance of the initial non-skippable section of a skippable ad—in contrast to non-skippable ads, skippable ads should highlight the brand and advertised product during the initial seconds. Third, skippable and non-skippable ads are usually regarded as substitutes but this study shows that they can work as complements in DVA campaigns. Advertisers should force a full ad exposure during the first ad encounter but make subsequent ad encounters skippable to optimize performance.

TB10
Virtual Room 10
Marketing & Consumer Finance
Special Sessions
Chair: Jung Youn Lee
Northwestern University, Evanston, IL
Co-Chair: Zhenling Jiang
University of Pennsylvania, Philadelphia, PA

1 - Buying and Payment Habits: Using Grocery Data to Predict Credit Card Payments

Jung Youn Lee, Northwestern University, Evanston, IL
Joonhyuk Yang, Eric Anderson

This study shows that individuals' habits in grocery shopping are incrementally useful in predicting their credit card payment behaviors, and that such incremental predictive power can alter firm decisions in the consumer lending market. Guided by different theories of habits, the authors find five broad grocery shopping habits that are correlated with credit card payment behaviors. Using machine learning models, the authors show that the incremental predictive gain in AUC from knowledge of the grocery habits ranges from 0.5% to 9.8%, which varies with the baseline data of lenders. Simulations of credit card issuers' credit extension decisions suggest that the profit impact of such predictive gain is greatest for consumers who do not have an established credit history. Further, use of grocery data may disproportionately increase the likelihood of getting access to credit for lower-income consumers. Overall, our results suggest that habits persist across domains, which opens up new opportunities in consumer lending.

2 - Consumer Choice and Corporate Bankruptcy

Megan Kelly Hunter, Boston College, Carroll School of Management, Chestnut Hill, MA
Samuel Antill

Using incentivized randomized experiments, we estimate the causal effect of a Chapter 11 bankruptcy filing on consumer demand for the bankrupt firm's products. Knowledge of a firm's Chatper 11 bankruptcy reduces consumers' willingness-to-pay by 18-35%, depending on the industry. We show evidence that consumers fear both (i) a liquidation preventing future relationships with a firm and (ii) a decline in quality while a firm reorganizes. Estimating a structural model of consumer demand, we quantify the large negative impact of bankruptcy on market share and consumer welfare.

3 - The Effect of Job Loss on Risky Decision Making

Abigail Sussman, University of Chicago Booth School of Business, Chicago, IL
Samuel Hirshman, Daniel O'Leary, Jennifer Trueblood

The unemployment rate in the reached 14.7%, 23.1 million people, in 2020. While negative effects of unemployment on health and well-being are well-understood, the influence of recent job loss on decision-making has received little attention. Across a controlled experiment (n = 201) and a large-scale survey (n = 32,368), we find that job loss increases risky decision making. In Study 1, we develop a laboratory task to examine whether participants who lose the ability

to earn money are more likely to make risky decisions than participants assigned to a control group that continues to earn. This study is designed to establish the internal validity of the proposed causal relationship between a recent job loss and risky decision-making. In Study 2, we survey 32,368 respondents about their own employment status and examine the relationships among job loss and three measures of risky decision-making. This survey provides evidence corroborating the finding that recent job loss is associated with increased risk-taking in a context with greater external validity. Further, participants who have lost their jobs most recently make the riskiest decisions. These findings have consequential implications for policymakers as the decision to engage in risky behaviors can have negative long-term physical, financial, and psychosocial consequences.

4 - Does TV Advertising Drive Mortgage Refinance Decisions?

Zhenling Jiang, University of Pennsylvania, Philadelphia, PA
Donggwan Kim

This paper studies how TV advertising affects consumers' loan decisions in the mortgage market. It is well documented that many consumers fail to refinance when interest rates decline. This can be problematic because consumers lose out on substantial savings, resulting in frictions in the transmission of monetary policy to consumption. Can TV advertising increase refinance activities? We combine 4 years of individual level mortgage origination data and TV advertising volume as well as video content to answer this question. We find that refinance advertising significantly increases refinancing volume (i.e., market expansive effect) as well as the choice of lenders (i.e., business stealing effect). In contrast, advertising targeted at new mortgages shows little effect in increasing volume, but it influences lender choice. Our results suggest that advertising can be an effective tool to encourage refinancing activities when interest rates are low. Finally, we extract the topics from TV advertising videos to study the effectiveness of different messaging content among heterogeneous consumers. Results shed light on what advertising topics work better for what types of borrowers. Our results have important implications for the government to increase monetary policy pass through from refinancing as well as mortgage lenders to design their advertising strategy.

TB11

Virtual Room 11
Social Impact and Consumers
Contributed Sessions
Chair: Rita Coelho do Vale

Universidade Catlica Portuguesa, Lisboa, 1649-023, Portugal

1 - Pandemic Response: How SARS Impacted Consumption of Food Prepared away from Home

Hui Wang, University of Guelph, Guelph, ON, Canada
Tirtha Dhar

The pandemic of COVID-19 has been the most pressing challenge facing the world today. Every aspect of life has been disrupted and consumers need to modify their routine activities under the uncertainty of how the pandemic plays out in the future. In this essay we attempt to understand how consumers change their consumption activities to respond to the uncertainty in their environmental surroundings by investigating the impacts of the pandemic on consumer's eating habits of food prepared away from home (FAFH). During a pandemic with a high death roll, safety is the top priority and when making dine-out decisions, consumers need to consider the risk of being infected by the disease and the penitential of giving the virus to others. In this paper, we focus on multistage purchase decisions, including dine-out (i.e., participation) decision, the selection of food type decision (such as beef, chicken, pork) conditional on deciding to dine out, and the food orders making decisions conditional on a specific type of food is chosen at the second stage. In this paper we use dataset from Canadian National Panel Division Group's Consumer Reports on Eating Share Trends (NPD Group's CREST) during year 2000-2006 to study the impact of the severe acute respiratory syndrome (SARS) pandemic outbreak in year 2003 on the consumption of FAFH. We measure the severity of the SARS outbreak from three aspects: the counts of news articles reported on SARS, negative sentiments and the SARS word frequency in the SARS news articles. Our estimation results of econometric models show that the SARS index by using negative sentiments has significant interaction. That means, compared to non-Ontarians, Ontarians were less likely to dine out when the news articles on SARS had more negative sentiments. However, consumers dined as usual once deciding to dine out. in other words, SARS outbreak had little impacts on what people dined once they decided to dine outside. We then estimate the impact of SARS under different counterfactual scenarios.

2 - The Impact Of The Covid-19 Pandemic On The Nutritional Quality Of Food Purchases

Ricardo Montoya, Catholic University of Chile, Santiago, Chile
Andres Elberg, Francisca Grandon, Cristian Dagnino

In recent years, health institutions have increased their warnings about serious diseases related to the mounting consumption of ultra-processed foods with low nutritional quality. Accordingly, several countries have improved their regulations and introduced more and better information (e.g., warning labels) to educate consumers to prefer (avoid) products with high (low) nutritional quality. Recently, the advent of the Covid-19 pandemic changed people's lives in multiple dimensions. Among these dimensions, the pandemic might have affected the nutritional quality of food purchases. On the one hand, increased health concerns may have improved the healthfulness of consumers' choices. On the other hand, the economic and psychological consequences of such an environmental shock may have caused consumers to shift their purchases towards less healthful choices.
In this research, we investigate how the Covid-19 pandemic has affected the consumption of macronutrients in a large panel of consumers. We combine individual-level transactional data from a big-box supermarket chain with the nutritional information of products collected by a third-party company. We analyze purchases before and during the Covid-19 pandemic to quantify the effect and determine whether this effect is heterogeneous across the population. We analyze heterogeneity due to, for instance, economic status, change in living conditions, or proneness to healthy consumption in the past.

3 - Corporate Social Responsibility and its Spillover Effects in Consumers' Behavior
Rita Coelho do Vale, Associate Professor, Universidade Catolica Portuguesa, Católica Lisbon School of Business and Economics, Lisboa, Portugal
Pedro Verga Matos, Filipa de Almeida
This article analyzes the impact of corporate social responsibility initiatives on the potential spillover effect on consumers' adoption of similar responsible behaviors. Several prior studies have reported that there is a considerable gap between consumers' apparent interest in CSR and the limited role of CSR in consumers' behavior (Aguinis and Glavas, 2012; Oberseder et al., 2011), with the link between exposition to a certain social behavior and its further adoption being very blurred (Dolan and Galizi, 2015; Lanzini and Thogersen, 2014; Truelove et al., 2014). We study then this potential spillover effect, analyzing to what extent consumers' exposure to CSR practices boosts their own tendency to engage in similar pro-sustainable and responsible behaviors. Data was collected through a longitudinal study using an online data panel, across 7 moments in time, engaging 400 participants, leading to 2511 observations, assessing the impact of different CSR initiatives (social, environmental and philanthropic) on multiple variables (e.g., action evaluation, behavioral intention, consumer engagement), across several industries

(e.g., FMCG, fashion, household retailing).Preliminary findings indicate that not all types of CRS initiatives lead to similar types of behavioral intentions and behavioral engagement. Interestingly, results suggest that although CSR initiatives in the social domain lead to higher behavioral intentions, these are not translated to actual behavioral engagement on social activities. Instead, environmental CSR actions are the ones revealing higher spillover effect, across multiple domains. These results offer insights to both regulators, public authorities, and managers, about CSR practices that are likely to generate higher environmental & social impact.

TB12

Virtual Room 12
Consumer Behavior II
Contributed Sessions
Chair: Sunxu Xu
Renmin University of China

1 - Untouchable: An Exploration of Consumers' Haptic Behavior in Shopping During the COVID Era
Joy L. Shields, Pepperdine University, Malibu, CA
Cristel A. Russell, Clark Johnson, Joann Peck
Touch is an important component in the consumer in-store shopping experience. This project highlights the coping mechanisms that consumers implemented when haptic interactions with products were limited due to the COVID-19 pandemic. To shed light on this phenomenon, a longitudinal qualitative design, focusing on a panel of 31 consumers who were the primary shoppers in their homes prior to, after, and during the height of the pandemic was conducted. Initial findings signal that the process through which consumers adjusted to the inability to touch resembles the stages of grief. Indeed, participants report many of the facets and experiences previously outlined in models of the grief process, for instance, Bowlby and Parkes' (1970) four stages of grief. In the first stage, Shock & Numbness, some consumers felt a sense of loss due to their inability to freely engage haptically with products as they once did. In the second stage, Yearning & Searching, consumers yearned for what they lost, spoke of experiencing anxiety, frustration, and sadness, and began searching for alternate ways to get back what was lost. In the third stage, Despair & Disorganization, participants reported feelings of anger, despair, and hopelessness while the initial acceptance of the loss brought the need to withdraw from shopping activities once enjoyed. Evidence of the fourth and final stage, Reorganization and Recovery, in which participants reflect on the new-normal, during which

intense feelings, such as anger and sadness begin to subside, and fond memories of past shopping experiences surface. The findings open new avenues for thinking about how trait-like consumer variables like the need for touch may be more malleable than previously sought, especially as a result of traumatic experiences.

2 - The Impact of Political Ideology on Consumers' Reactions to Hotels' Donations of Rooms

Sohyun Bae, Assistant Professor, National Cheng Kung University, Tainan, Taiwan

During the COVID-19 pandemic, one of the remarkable corporate social responsibility (CSR) activities that many hotels have engaged in has been providing unsold rooms to people in need (e.g., frontline medical professionals and homeless people). However, not much research has been conducted to examine what factors influence consumers' reactions to hotels' donations of rooms. To fill that gap, in this research we propose that consumers' political ideology (i.e., conservative vs. liberal) affects their attitudes toward hotels that have donated rooms to homeless people versus medical professionals. Through three experiments, we found that conservative participants showed less positive attitudes (e.g., lower willingness to stay) toward hotels that had donated rooms to homeless people than liberal counterparts because they felt more disgust toward those hotels. However, there was no difference in attitudes between conservative and liberal participants when a hotel had donated rooms to medical professionals. We further found that hotel type (i.e., luxury vs. non-luxury) moderates the effect of political ideology on consumers' attitudes toward hotels that have donated rooms to homeless people. This research provides valuable insights for marketing managers in the hotel industry and policy makers about how to design more effective room donation campaigns during the pandemic.

3 - Reason Versus Feeling: The Impact of Exposure to Nature on Consumers' Decision Making

Sunxu Xu, Renmin University of China, Beijing, China
Ying Ding

Decades of research have demonstrated that exposure to nature can provide extensive physical and psychological benefits to humans. However, little research attention has been given to how exposure to nature might influence consumer behavior. Drawing from an interdisciplinary perspective, the present research aims to systematically investigate the impact of exposure to nature on consumers' decision-making. Based on previous literature, consumer decisions can be made either in a cognitive, reason-based

manner or in an affective, feeling-based manner. We propose that exposure to nature will promote greater reliance on affective feelings (vs. cognitive reasoning), which will increase the relative preference for affectively superior options as opposed to cognitively superior options. The results of Study 1 (N = 234) showed that participants in the nature condition were more likely to choose the affectively superior apartment than the cognitively superior apartment compared to participants in the built and control conditions. Study 2A (N = 136) demonstrated that exposure to nature increased consumers' relative reliance on affective feelings (vs. cognitive reasoning), and Study 2B (N = 113) showed that a feeling-based (vs. reason-based) strategy can increase consumers' relative preference for the affectively (vs. cognitively) superior laptop. Theoretically, by identifying exposure to nature as a novel environmental antecedent that influences consumers' decision-making strategies and consequential product preferences, our research not only extends the research scope of exposure to nature but also provides a new angle to the literature on decision-making. Managerially, marketers can tailor the store environment to the advertising plan. For example, marketers can add natural elements to the marketing environments when highlighting products' superior affective features.

TB13

Virtual Room 13
Social Media Monitoring and Disclosure
Contributed Sessions
Chair: Eunhee (Emily) Ko
Northwestern University, Evanston, IL

1 - Emotional Variability and Consumer Engagement: The Case of a Large Live Streaming Platform

Chongyan Sun, The Chinese University of Hong Kong, Hong Kong
Francisco Cisternas

Online streaming is the newest and fastest growing media over the last decade. Large platforms companies such as Meta (Facebook), YouTube, Twitch and Periscope have dedicated infrastructure for online streaming and it has allowed the growth of what has become a multi-billion dollar industry. In this industry, increasing consumer engagement is the top priority to achieve financial growth. Previous literature analyzed the influence of emotional reactions of streamers and viewers on volume of comments and tips. They found that status seeking and reciprocity were the main drivers of comments and tips, but those attributes do not vary

overtime, which is not reflected on the temporal distribution of comments and tips, where their volatilities tend to cluster together, causing strong fluctuation of engagement levels along timelines. To provide deeper understanding on this phenomenon, we have estimated a multivariate general autoregressive conditional heteroskedastic (MGARCH) model at levels of various time periods with a number of sessions from a large Chinese live streaming platform to illustrate that consumer engagement level and emotion valence present strong volatility clustering themselves even after controlling the influence of the streamers, and more importantly, more volatile viewers' emotion is associated with a higher level of their engagement, operationalized by the comment volumes. These results suggest that online platforms should carefully manage the volatility of viewers' emotion other than its mean levels to promote more consumer engagement.

2 - Firms' Engagement with Stakeholders During a Crisis And its Impact on Firm Outcomes: Evidence from Social Media Communications

Eunhee (Emily) Ko, Northwestern University, Evanston, IL
Yoo Na Youm

The COVID-19 pandemic has posed unprecedented challenges to firms. With the high uncertainty surrounding the pandemic, sharing and transmission of information became critical - in the setting of the workplace, rapid sharing of a firm's stance in responding to the crisis was critical. Among the many unexplored questions regarding the impact of the COVID-19 pandemic, and in lines with a call for a deeper understanding of firms' strategic choices under crisis, we explore firms' engagement with stakeholders with the onset of the COVID-19 pandemic. We examine the questions in the context of firms on the S&P 500 list and the strategic choices they make in communicating with stakeholders on social media (Twitter). Specifically, in looking at the role of trust in effective stakeholder engagement, we explore organizational responsiveness, connectedness of stakeholders, the contents (text and images) and underlying emotions of tweets as multidimensions of trust. We use big data and machine learning to compile and carry out content analysis and categorization of the text and images of tweets, followed by econometric models to test our hypotheses. We seek to make three contributions. First, we theoretically extend the essentials of strategic and pragmatic components of stakeholder engagement by incorporating multidimensions of trust and through an inclusive approach to stakeholders. Second, by exploring the context of firm-stakeholder engagement on social media, we provide a novel way to effectively measure stakeholder engagement, addressing the lack of validated measurements of the construct. Finally, by

examining the questions in light of the COVID-19 pandemic, we address the call for a deeper understanding of firms' strategic choices under crisis.

TB14

Virtual Room 14
Advances in Bayesian Modeling and Computation: Field Applications
Special Sessions
Chair: Nicolas Padilla
London Business School, London, United Kingdom
Co-Chair: Ryan Dew
University of Pennsylvania, Philadelphia, PA

1 - Contextual Song and Playlist Recommendation: A Bayesian Generative Modeling Approach

Khaled Boughanmi, Cornell University, Ithaca, NY
Asim Ansari, Yang Li

Playlists have become the principal mechanism for music listening since the revolution brought about by digital streaming services. As an example, the Spotify platform alone accounts for more than 4 billion user-curated playlists that are carefully compiled for a variety of musical tastes and consumption contexts. Given the immense heterogeneity in musical tastes and the endless number of playlists that can be constructed, the design, completion, and recommendation of personalized playlists have become critically important. In this paper, we develop a novel Bayesian generative modeling approach to perform these tasks. We identify the musical preferences of online users for diverse musical styles and listening contexts in an unsupervised fashion. Specifically, we leverage Variational Autoencoders (VAE) to uncover latent variables that summarize the musical themes and contextual moods associated with songs and playlists. We fit our model using a rich data set containing playlists that are curated by Spotify users. Our empirical investigation yields interesting insights about the diversity in musical preferences across users and contexts. We leverage the results of our model to cross-recommend curated playlists to users with similar thematic preferences, complete existing playlists with songs of congruent mood and context, and automatically design new playlists for personalized musical experiences.

2 - Learning Customer Heterogeneity from Aggregate-Response Online Experiments

Mengyao Huang, University of California Berkeley - Haas School of Business, Berkeley, CA
Longxiu Tian

This research seeks to understand how firms should design and utilize online randomized control experiments, or A/B testing, to optimally learn the preference distribution of their customer-base when only aggregate-response test results are available (e.g., total impressions and clicks). To solve this problem, we develop a scalable hierarchical Bayesian (HB) aggregate logit model to identify multivariate distributions of within-test consumer preference heterogeneity, by leveraging between-test variations. We illustrate the proposed method using both simulated studies and a dataset of 32,487 news headline tests (totaling 150,817 variations) from an online media platform. To quantify the design space of headline tests, we decompose textual headlines into latent representations via Transformer networks and provide interpretability via transfer learning of latent features from news headline corpora that have been prelabeled on topics and sentiment. We relate empirical results to dependent variables-of-interest (i.e., within-test click-through rate (CTR) and firm-declared winner) and show how firm decisions would deviate due to not accounting for customer heterogeneity. We find that preference heterogeneity significantly affects selection of optimal aggregate-response A/B tests and discuss the implications of our findings for efficient test design in the news headline setting.

3 - Unified Marketing Measurement under Privacy Regulations
Nicolas Padilla, London Business School, London, United Kingdom
Ryan Dew

In the face of increasingly strict privacy laws, digital marketers face unprecedented challenges in measuring the effectiveness of campaigns, particularly at the customer and campaign levels. These new restrictions on customer-level trackability have broken commonplace multi-touch attribution models (MTA), which have become the primary tool by which companies measure effectiveness at the most granular level. While this new environment has made drill-down measurement difficult, it has had a limited impact on the ability of marketers to use classic measurement tools like media mix models (MMM), which have always been built on aggregate measures of campaign spend and performance. In this work, we propose a unified marketing measurement (UMM) framework, rooted in the idea that media mix models and attribution models are both measuring the same estimand: marketing effectiveness. Methodologically, we use a Bayesian framework to jointly model customer-level attribution and aggregate media mix effectiveness through two interrelated components, which are constrained to yield the same insights about campaign effectiveness. This theory-based constraint allows us to identify components of the individual-level model that

would be otherwise difficult. We apply our model using a dataset from a large retailer that includes wide-ranging data about customer activity and campaign performance, including A/B tests, which allow us to validate the performance of the model.

4 - Leveraging Gaussian Processes for Counterfactual Inference in One-shot Field Experiments: Evidence from a Large-scale Donation Drive
Kee Yeun Lee, UNIST, Ulsan, Korea, Republic of
, Gwen Ahn, Fred M Feinberg, Arnaud De Bruyn

Numeric scales are ubiquitous throughout social science and economics. For charities, specifically, appeals scales (specific amounts from which donors can choose) are standard solicitation tools. Isolating their effects on actual downstream donor behavior - whether (incidence) and how much (amount) to give - is bedeviled by uncontrollable self-selection and endogeneity effects that hinder optimal individual-level scale design.

Our data stem from a fully randomized field experiment that orthogonalized major components of the appeals scales - minima, maxima and pace of increase - for over 50,000 donors of a large national charity. Assessing the effectiveness of both manipulations, as well as consequent optimization, requires individual-level counterfactuals. To this end we develop a hierarchical multi-output Gaussian Process (GP) model that jointly accounts for donation incidence and amount while incorporating donor heterogeneity. The GP nonparametrically "smooths" over each donor's history while leveraging the full corpus of data to provide joint posteriors for treatment effects on both incidence and amount, and consequently overall expected donation gain. This in turn allows the charity to better tailor individual appeals scales and request timing for subsequent donation drives.

Thursday, 11:30am–12:30pm

TC01

Virtual Room 01
Game Theory II
Contributed Sessions
Chair: Liang Guo
Chinese Univesity of Hong Kong, Hong Kong, China

1 - Consumer Targeting and Service Upgrades
Jiong Sun, Purdue University, West Lafayette, IN
, Yingchen Yan

This paper studies dynamic service upgrades when the firm can price discriminate between new and repeat consumers but consumers can choose whether their privacy is revealed. We find that consumer targeting is not always profitable by discovering a U-shaped effect of privacy cost on profitability. Our study also suggests a personalization trap by finding that consumers conceal their privacy when privacy cost is intermediate, which in turn results in service upgrade over-distortion, upward or downward.

2 - Advertising Content: The Role of Messengers
Chi-Ying Wang, Yale School of Management, New Haven, CT
, Jiwoong Shin
We develop a model of communication messenger in advertising where advertising can generate a product-match related signal for consumers. We take a dual-mode of communication perspective for advertising communication. In our model, a messenger serves as a cue which is communicated through less costly peripheral route while the central issue-relevant information requires thoughtful consideration. We consider advertising as a problem of Bayesian Persuasion where communication messenger can determine the information structure the consumer will face, and a different type of communication messengers can affect such information structure. Our model provides a rich set of insights concerning the impact of different types of messengers on the incentives for consumers to deliberate the advertising message, and the firm's optimal choice of communication messenger and prices.

3 - The Voice of Customers in Customization
Liang Guo, Chinese Univesity of Hong Kong, Hong Kong, China
Recent years have seen a growth in the production capability and the demand for customized products and services. As a prerequisite for customization, private information on individual customer's quality preference needs to be uncovered. Sellers can listen to customers about their stated or self-reported preferences through direct communication (e.g., conversation, survey). Alternatively, customer preferences can be inferred from their behavior when they are given the rights to self-design the quality. Yet customers may misrepresent their stated/inferred preferences to strategically manipulate the customization process. In this research we endogenize the viability of customization by investigating whether and when customers may reveal their quality preferences truthfully. We find that, for either preference-learning approach, customers would voice their preferences faithfully if and only if they are sufficiently heterogenous. Equilibrium preference revelation, and hence endogenous customization, tend to be sustained by intermediate seller bargaining power or non-extreme production/design costs. We also examine how the preference-learning approaches may differ in the endogenous feasibility of customization, equilibrium qualities, and the parties' expected payoffs. We show that giving up the design right need not always be harmful for the seller, and gaining it can make the buyers worse off, especially when fixed costs of customization are considered.

TC02

Virtual Room 02
Behavioral IO: Theory and Evidence II
Contributed Sessions
Chair: Zuhui Xiao
University of Wisconsin-Milwaukee, Milwaukee, WI

1 - Does Sunk Cost Affect Prices? Evidence from the U.S. Airline Industry
Qihong Liu, University of Oklahoma, Norman, OK
In contrast to the extensive literature on behavior bias by individuals, studies on behavior bias by firms have been relatively scarce. We explore the possibility of the latter in the context of U.S. airlines, where fuel hedging leads to lump sum gain or loss which is sunk to airlines' pricing decisions. Our results show that the (sunk) hedging gain or loss affects airlines' ticket prices. In particular, a 10% reduction in the reported fuel cost (due to hedging gain) leads to a 2.2% reduction in ticket prices. Moving onto non-price decisions, we find that hedging gain leads airlines to use larger aircrafts and reduce airtime of their flights, but has no impacts on the number of routes and flights which airlines operate. Our results provide empirical evidence that fixed/sunk costs can affect firms' price and non-price decisions, establish a link between financial market and product market competition, and have important welfare/policy and managerial implications.

2 - Inattention Skimming: Theory and Evidence from Resale Markets
Andreas Kraft, PhD Candidate, University of Texas - Austin, Austin, TX
Raghunath S Rao
Evidence of consumer inattention has been found in various settings, both inside and outside the laboratory. It is, however, less clear how inattention affects market outcomes. Can firms profit from consumer inattention? If so, by how much? Does competition alleviate and save inattentive consumers? We answer those questions in the context of secondary markets. We find that intermediaries and the product owners in these

markets benefit when buyers are inattentive to an important product attribute. Our model shows that the competition between intermediaries and decentralized consumer-to-consumer markets results in a behavioral segmentation of the market. The intermediary skims inattentive consumers while attentive consumers are served in the consumer-to-consumer market. We test our theory using a detailed dataset consisting of millions of automobile transactions over seven years. First, we find clear evidence of a specific type of inattention: Buyers exhibit left-digit bias and systematically underestimate the depreciation of vehicles with odometer readings immediately below round cutoffs (e.g., 49,950mi vs. 50,000 mi). Second, the level of estimated inattention in dealer transactions is twice as high as in private transactions, resulting in dealers making a significantly higher margin for such vehicles. Third, we estimate the supply-side response to consumer inattention and find that there are 2.19% fewer transactions in the full attention counterfactual. As a result, the average profit margin is 2.36% lower, leading to an aggregate decrease in profits of 4.94% or about $500 million within our sample period. Back-of-the-envelope calculations imply that U.S. used vehicle dealers' annual profits attributable to consumer inattention to depreciation are about $800 million.

3 - Smart Pricing Recommendations by Platforms
Zuhui Xiao, University of Wisconsin-Milwaukee, Milwaukee, WI
Yi Zhu, Mark E Bergen
Online platforms such as Airbnb increasingly provide smart pricing recommendations (SPR) based on AI technologies with the hope of facilitating market transactions between buyers and sellers. Platforms claim that SPR can help sellers find the right prices. Yet sellers often complain SPR as being too low. We believe exists behavioral reasons when underpriced SPR can be beneficial. We develop a game-theoretic model that incorporates behavioral factors in pricing in a cheap-talk setting and show when platforms will find it beneficial to provide selectively underpriced SPR to induce buyers and sellers to make a deal. As a result, the underpriced SPR, even though not fully informative, facilitate new exchanges that would be impossible with fully informative SPR. Our work broadens the understanding of platforms' impacts in pricing and market exchange, and sheds new insights on platforms' information provision in a world increasingly focused on big data and AI technologies.

TC03

Virtual Room 03
Influencer Marketing III
Special Sessions

Chair: Andreas Lanz
HEC Paris, Paris, France
Co-Chair: Reto Hofstetter
University of Lucerne, Lucerne, Switzerland

1 - Modeling Demand for Independent Product Video Reviews
Maciej Szymanowski, Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands
Gabor Murai
Product reviews produced by content creators are popular on social media and constitute an important source of brand information for consumers. Understanding consumption of such content is, therefore, important for marketing scholars and practitioners interested in how consumers learn about brands. In this paper we study two fundamental issues about demand for the content creator generated reviews, 1) whether the demand is driven by the product being reviewed, and by the content creator, 2) are reviews from different content creators of the same products substitutes or complements. Using longitudinal data on video reviews of personal smart devices posted on YouTube, we provide the first evidence about demand for earned media. We find that both product and content creator are significant drivers of demand for content creator generated reviews. We also find that videos about the same product, published by different creators, benefit one another's viewership in the short run, presumably by attracting attention to the product featured. However, in the long run, views captured by one review have a negative association with the number of subsequent views of competing reviews. We discuss the findings and draw conclusions for managers.

2 - Brand-Influencer Collaborations and Change in Content Strategy
Anwesha De, Bocconi University, Milano, Italy
Beth Fossen
With the rapid rise in the number of social media users and the increase in the amount of time spent on social media, social media platforms present brands with a more dynamic and interactive platform to engage consumers. However, despite the increasing investments in social media over recent years, there are concerns about the contribution of these investments to firm performance. While literature highlights the importance of social media influencer marketing for marketers, research on the consequences of such brand-influencer collaborations is still nascent. In this paper, we focus on the influencer's content strategy in the brand-influencer relationship. While such a change in content strategy by influencers may be driven by the motivation to increase engagement, it may potentially have severe

repercussions. Using data from 75 social media influencers across three industries, we investigate the impacts of brand-influencer collaborations and changes in content strategy on engagement. We find that when influencers mention brands in their posts, they see a decrease in engagement. Moreover, we show that influencers tend to change their content strategy in terms of the arousal expressed in the language when they post branded content. We find that when influencers change the arousal of their content when posting about brands, this further reduces engagement both in terms of the number of shares and replies. We probe the mechanism driving this negative relationship and find evidence that changes in content strategy by influencers may come across as overly promotional and trigger persuasion knowledge in followers.

3 - Endorsement Portfolios of Social Media Influencers

Lisa Zäuner, Goethe University Frankfurt, Frankfurt, Germany
, Simone Wies, Alexander Bleier, Alexander Edeling

Brands increasingly rely on social media influencers to promote their products because consumers tend to perceive such endorsements as less commercial than brand ads. However, influencers can engage in various collaborations, for instance across several categories and with multiple brands, which may lead their activities to be perceived as more commercial. As a result, such influencers' effectiveness to generate engagement with their sponsored content may suffer. This research examines the relationship between four characteristics of influencers' endorsement portfolios (number of endorsed categories, number of brands within each category, simultaneous versus sequential collaborations, and fit of other non-brand-related posts) and the effectiveness of their influencer marketing activities. The results help influencers effectively manage their endorsement portfolios as well as brands to determine which influencers to collaborate with.

4 - Influencing on Short or Long Leashes? How Contract Design Drives Influencer Marketing Performance

Reto Hofstetter, University of Lucerne, Lucerne, Switzerland
Andreas Lanz, Navdeep Sahni, Martel Faltl

Influencer marketing has become an important way to reach out to consumers. Different from traditional advertising, it works in a decentralized fashion in which a user of a social network--typically with a somewhat large following--endorses a firm via user-generated content. Theuser generating the content, commonly referred to as influencer, acts as an

intermediary between the firm and a target segment, where the carrier of influence is the content, which disseminates into the influencer's follower base and beyond (e.g., Goldenberg et al. 2009).Common to influencer marketing are behavior-based contracts in which managers emphasize the behaviors that they expect to lead to bottom-line results. Taking into account that influencers may pursue egocentric goals that deviate from corporate objectives, managerswould have to adapt these contracts--put them on a short leash--and constrain influencers' behavior to align objectives in influencer marketing campaigns. Despite this threat of a principal-agent problem being present, the common belief amongmanagers is that they should avoid managing and briefing influencers too closely (Haenlein etal. 2020). The rationale is that influencers better understand their follower base than the managers and should thus be put on a long leash--to be given full autonomy when creatingtheir content. In line with this common managerial belief, we find that more (versus less) constraining contracts do not have an effect on bottom-line results in influencer marketing campaigns. Even worse, more constraining contracts limit the manager's recruiting ability. More specifically, preliminary empirical evidence from the analysis of over 10,000 influencers and 1,300 actual Instagram campaigns carried out via the influencer marketing platform Reachbird.io indicate that contracts imposing stronger behavioral constraints with respect to content creation have no effect on engagement with sponsored Instagram posts, although significantly lowering participation of influencers in campaigns. We gain convergent validity of these empirical findings in a (supply-side) field experiment with more than 200 participating influencers.

TC04

Virtual Room 04
Sales Force Management and B2B I
Contributed Sessions
Chair: Yuanchen Su
University of Minnesota, Minneapolis, MN

1 - How Does a Sales Agent's Network Structure Impact Her Sales Performance? Evidence from a Multilevel Marketing Firm

Sung Joo Kim, Krannert School of Management, Purdue University, West Lafayette, IN
Wreetabrata Kar, Sivaramakrishnan Siddarth

Multilevel Marketing firms (e.g. Mary Kay) play an important role in many economies but have been understudied in the academic marketing literature. In this research we attempt to empirically identify how sales agents respond

to compensation structure in a setting in which agents can influence sales performance in different ways: personal consumption, sales to customers, and sales from downline sales agents. We analyze sales data for 39201 agents over 2 years from a large multilevel marketing firm in the US. Our reduced form analysis shows that agents put more effort around bonus boundaries in order to achieve higher commission rates. We also propose and estimate a structural econometric model of agent performance that accommodates the costs and benefits of different sales tactics in order to uncover the heterogenous ways in which agents respond to the different compensation elements and derive implications for the firm's design of compensation plans.

2 - How to Incentivize Sales Managers: Evidence From a Field Study

Aritra Bhattacharya, PhD Student, Indian School of Business, Mohali, India
Raghu Bommaraju, Robert Waiser

The importance of suitable incentive contracts to motivate sales employees is well understood. Existing literature in sales marketing focuses on the incentive structure of sales representatives to characterize an optimal plan. However, there is little theoretical and empirical work on sales managers' incentives. We investigate whether sales managers should be compensated based on the cumulative target achievement of their salespeople or based on the number of salespeople achieving their individual targets. While the former is the most used in firms, this could create two potential issues. First, managers may focus on top-performing salespeople and ignore poor performers. Second, while the former approach helps maximize revenues in the short run, the latter can help bring territory balance that can aid in the firm's long-term performance. We rely on a quasi-experiment to understand the effectiveness of the latter approach. Our data consists of 137 sales territories under 54 managers of a pharmaceutical firm in India across two years. The results indicate that incentivizing sales managers based on the number of salespeople achieving their individual targets is more effective than incentivizing managers based on cumulative target achievement. We further examine the moderating effect of territory type and salespeople's past performance.

3 - Disentangling Monetary and Social Effects of Sales Contest Leaderboards

Yuanchen Su, University of Minnesota, Minneapolis, MN
George John, Madhu Viswanathan

Sales contests, which use relative performance to evaluate and reward employees, have long been considered a viable short-term tool for improving efforts. Often, these contests are multi-period with interim results available. One issue unsettled is whether interim results should be published as public leaderboards. Leaderboards influence monetary motivation - interim standings allow contestants to better calibrate their effort given their distance from the prize(s). They also influence social motivation - the first page of the leaderboard brings social recognition whilst being on the last page is disheartening. Using data of five 8-week long contests with leaderboards updating twice a week, we find next-day sales after each leaderboard update displays a U-shape. Specifically, salespeople on the first page or the last page make more sales than people who are on the intermediate pages. This offers identification of social motivation since a purely rational model predicts people who are on the last page would make fewer following-day sales than people on the penultimate page since people on the last page have less chance to catch up and win the prize(s). Regressions reinforce this takeaway. People who are close to the boundaries of the first and last pages make more next-day sales than their neighbors. These neighbors are farther away from the boundary but assumed to have similar monetary motivation with people close to the boundaries since they have similar cumulative sales. We build a structural model to estimate a) monetary motivation sensitivity, b) social motivation sensitivity, and c) cost of effort. These deep parameters help disclose the mechanisms at hand.

TC05

Virtual Room 05
Marketing and Innovation
Contributed Sessions
Chair: Raveesh K Mayya
NYU Stern School of Business, New York, NY

1 - Determinants and Financial Implications of Business Model Innovation: Evidence from Initial Public Offerings

Priya Rangaswamy, Texas A&M University, College Station, TX
Alina Sorescu

The innovation literature has primarily focused on product (goods and services) innovations. Empirical evidence on a prevalent form of innovation—business model innovation—remains scarce. The authors propose a model of the determinants of business model innovation and contrast them with known determinants of product innovation from extant literature. They also examine the financial consequences of business model innovation and test their predictions in the context of Initial Public Offerings (IPOs). Empirically, the

authors propose a method to quantify firms' focus on product or business model innovation through text analysis of the business descriptions from firms' IPO prospectuses. The authors find that compared to firms that focus on product innovation, firms that pursue business model innovation are larger, younger, have less firm-level technical knowledge, and operate in higher-growth industries. The results also suggest that while investors value all types of innovation, they value business model innovation more than product innovation.

2 - Impact of Multi-staged Promotional Interventions on Smart TV Viewers - Evidence from a Large-scale Randomized Field Experiment

Raveesh K Mayya, NYU Stern School of Business, New York, NY
Siva Viswanathan

Digital technologies have vastly diminished the effectiveness of mass marketing and have given rise to context-based marketing. Yet, most evidence to effectiveness of contextual marketing are anecdotal. We quantify their effectiveness in a setting where people watch linear content on internet connected smart TVs. This setting enables two opportunities to researchers (1) to dynamically overlay contextual marketing interventions on linear content (2) to enable multi-stage content engagement where viewers send content from smart TV to connected smartphones. Working with a smart TV intelligence platform to run a randomized trial, we study the impact (on viewers' multi-stage engagement outcomes) of two prominent contextual interventions studied in marketing literature: time-pressure and social-pressure. Specifically, we ask and answer: (a) Which contextual effects (time and/or social pressure) are more effective in increasing consumers' content engagement in early stage (on-TV) and in later stage (on-Phone)? and (b) How do these contextual effects interact with each other and across stages to provide a best lift in the engagement outcome? Our interventions encourage viewers consume a customized relevant content on-Phone based on what they are watching on-TV. Results suggest that negatively framed time-pressure message on-TV performs significantly better in nudging TV viewers to send content to their smartphones, compared to none or simple time-information message. Social-pressure nudge along with time-pressure nudge provides best outcomes on-TV. However, such viewers are less likely to respond in later-stages(on-Phone). Thankfully, social-pressure message improves later-stage outcomes for those viewers. Our findings are of practical importance. Early-stage success need not translate into overall success; interventions are needed and have to be measured in each stage. We show that contextual interventions interact

within and across stages to provide best lift in outcomes. Finally, we demonstrate that contextual marketing works in a Linear TV viewing context.

TC06

Virtual Room 06
AI Adoption Implications
Contributed Sessions
Chair: Yan Huang
Tepper School of Business, Carnegie Mellon University, Pittsburgh, PA

1 - Identifying Marketers' Skills from Self-presentation in Profile Pictures

Olga Goncalves, IAE University of Perpignan (MRM), Perpignan, France
Camille Lacan

Internet Platforms of the sharing economy struggle with identifying the most skilled marketers on their platforms. Current approach uses online consumer ratings as well as marketer's online activity information to distinguish the most skilled but it requires several months or years before knowing the result. Drawing from the impression formation theory and the evolutionary psychology, this research examines whether marketers' self-presentation in a profile picture could be an early signal of their skills and turns to the deep learning models on visual information processing to solve this cold start issue. A pre-trained CNN deep learning model (VGG-Face) combined with trained models extract the hidden features of profile pictures from 37,002 Airbnb hosts (balanced between hosts and superhosts). These features are augmented by contextual information and entered into a tenfold cross-validated binary classifier (Logit). Superhost marketers were correctly identified in 63% of cases, better than chance (50%, Cohen's d = .38). The most predictive elements are the attributes of the marketer's face (morphology, attractiveness) and demographics (age, gender). Transient features (facial emotions, head poses) and social context (number of persons) improve marginally accuracy. These findings highlight the value of facial recognition to identify marketers' skills and have practical implications for training and the management of marketers.

2 - Deep Reinforcement Learning for Sequential Promotions

Xueming Luo, Temple University, Philadelphia, PA
Wen Wang, Beibei Li

Deep reinforcement learning (DRL) has opened up many unprecedented opportunities in revolutionizing the

digital marketing field. In this study, we designed a DRL-based personalized targeting strategy in a sequentialsetting. We show that the strategy is able to address three important challenges of sequential targeting. 1)Forward-looking: balancing between a firm's current revenue and future revenues; 2) Earning-while-learning:maximizing profits while continuously learning through exploration-exploitation; 3) Scalability: coping with ahigh-dimensional state and policy space. We illustrate the above through a novel design of a DRL-basedartificial intelligence (AI) agent. To better adapt DRL to complex consumer behavior dimensions, we proposeda quantization-based uncertainty learning heuristic for efficient exploration-exploitation. Our policy evaluationresults through simulation suggest that the proposed DRL agent generates 26.75% more long-term revenuesthan can the non-DRL approaches on average, and learns 76.92% faster than the second fastest model amongall benchmarks.

3 - Improving Churn Detection by Tackling Redundancy in Big Data

Christian Colot, PostDoctoral Researcher, University of Luxembourg, Luxembourg, Luxembourg
Zoran Obradovic

The explosion of digital data has led to very promising opportunities to leverage it for decision-making. However, a key challenge is to deal with the redundancy issue that might arise among extracted features. This redundancy might indeed lead to select a sub optimal model and also to slow down the convergence of the algorithm. In the present empirical study, we compare the performance of a recent variation of Random Forest namely Essence Random Forest to Gradient Boosting for churn prediction within a telephone company. In particular, this case study includes multiple extracted features from unstructured data with a high level of redundancy. Our results highlight that, without any time constraint, Gradient Boosting reaches a higher classification performance. However, Essence Random converges approximately four times faster than Gradient Boosting to its best performance. Notably, the latter method overtakes the former after 2.7 times the time needed for Essence Random Forest to offer its best result. Overall, these results indicate that the choice of the algorithm depends on the importance of time in the context. What is more, a hybrid combination of both algorithms might be considered as future work as the key mechanism behind Essence Random Forest i.e. a weighted random sampling of features according to redundancy might be implemented in Gradient Boosting. This hybrid combination might potentially speed up the convergence of Gradient Boosting.

4 - Simplicity is the Ultimate Sophistication: Price Match vs. Reinforcement Learning

Yan Huang, Carnegie Mellon University, Pittsburgh, PA
Qiaochu Wang, Param Vir Singh

Retailers are increasingly using pricing algorithms to automatically update their prices to improve profit. Reinforcement learning (RL) based pricing algorithms are particularly appealing for this purpose because they can autonomously learn an optimal pricing policy that best responds to competitors' price changes without prior knowledge of the competitors' strategies and the market environment and, more importantly, can adapt to any evolution in competitors' pricing strategy. It is commonly believed that sophisticated RL based algorithms have a significant advantage over simple rule-based pricing algorithms; therefore, in a competitive environment, firms should also adopt RL based pricing if their competitors are using such algorithms. However, through extensive pricing experiments in a model of repeated price competition, we show that a firm's best response to its competitor's sophisticated RL based algorithms is to use simple rule-based pricing algorithms, such as price match. In fact, price match dominates RL, supervised learning, and multi-armed bandit based pricing strategies as a response to the competitor's RL algorithm. The results hold when the products offered by the competing firms are either identical or horizontally differentiated. We provide theoretical rationale and empirical evidence to explain the dominance of price match and discuss policy implications.

TC07

Virtual Room 07
Machine Learning Applications for Unstructured Marketing
Special Sessions
Chair: Siliang Tong
Nanyang Technological University, Philadelphia, PA
Co-Chair: Mariya Topchy
University of Connecticut, Manchester, CT

1 - Does Social Media Participation Benefit Product Content Generation? Evidence from a Social Media Shutdown

Sihan Fang, Nanyang Technological University, Singapore, Singapore
Siliang Tong, Yingjie Zhang, Junhong Chu, Zhijie Lin

Leveraging a quasi-natural experiment of an unexpected shutdown of a social media channel in a large social marketplace, we investigate how individual sellers' social media participation affects their motivation in product listing and their efforts in product content generation. Empirical results demonstrate that the shutdown leads to a lower likelihood of sellers posting a resale product and fewer product listings, suggesting that sellers might have a lower resale motivation. One plausible explanation is that social media participation helps reduce sellers' hassle cost of product resale as it provides social support and resale inspiration. Text mining analyses of product descriptions provide evidence to support the proposed cost reduction mechanism of social media participation. The results show that sellers create product content with a lower level of usefulness (i.e., shorter and less concrete product description) and fewer sentiment expressions (i.e., applying fewer positive sentiments and emotions), indicating that the increased hassle cost reduces the level of elaboration in content generation after the social media shutdown. In addition, the identified effect is more salient for sellers who are less familiar with the resale process (i.e., have less resale experience in the marketplace) or more sensitive to the hassle cost (i.e., have a fulltime occupation). The paper offers important implications for social marketplace managers in promoting seller product content generation and driving supply growth.

2 - Understanding Parent Opinions Using a Joint Pyramid Attention Network

Wenchang Li, Sichuan University, Sichuan, China
John P Lalor, Yixing Chen, Qiangming Yan

In recent years, school rating platforms such as GreatSchools, NICHE, and U.S. News & World Report have become an important part of the landscape in facilitating parental choice when selecting schools. These platforms host a vast number of parent-generated school reviews, and such unstructured information is valuable for parents to make decisions and for schools to get feedback for their services. Therefore, mining parent opinions is crucial to supporting high-quality education services. Aspect-based sentiment analysis (ABSA), a text analysis task that extracts aspects from reviews and classifies the sentiment polarities attributed to each aspect, is closely related to extracting parent opinion towards various aspects of education services. However, the lack of gold-standard aspects and aspect-level annotations make building such an ABSA system difficult. In this paper, we propose a joint learning network for ABSA without aspect-level annotations. Our approach includes unsupervised aspect extraction and supervised sentiment classification trained simultaneously. For the sentiment classification task, we design a pyramid attention network (PAN) that uses easy-to-obtain review-level ratings as labels for training. At

the same time, PAN can capture sentiment at three levels: word-level, aspect-level, and review-level, for rich, detailed interpretability. Experiments on GreatSchools parent review datasets demonstrate that our approach can discover meaningful aspects from the reviews and shows a promising result on the review-level sentiment classification task.

3 - Regulatory Focus Shifts in Response to Arbitrary Temporal Boundaries: A Quasi-Experiment on Twitter

David DeFranza, University of Utah, Salt Lake City, UT
Promothesh Chatterjee

Every day, individuals schedule events, make goals, and estimate the time remaining until a deadline occurs. For example, imagine the month is November, and a holiday sale is approaching in 15 days. Does the way consumers think about the event change if it falls on November 28 or December 2, all else being equal? We use distributed language models and more than five million tweets spanning 11 years to address this question. Our findings suggest a correlation between expressions of a promotion focus, more abstract language, and increasing prospective and retrospective distance from an event. In addition, the presence of a temporal border is associated with more distant construals for a given day, controlling for the objective distance to the event. We find that individuals show signs they consider events occurring at the beginning of the next month to be further away than those occurring at the beginning of the current month. Thus, while time is a necessary consideration, time itself is not interpreted objectively. Understanding this is important for the tasks outlined above, but also for managers, policy makers, and others establishing and enforcing deadlines. Moreover, introducing a new moderator, temporal borders, may be helpful for future researchers exploring regulatory and construal level theories and practitioners concerned with establishing a regulatory and construal level match in their communications. Finally, our work demonstrates the use of a powerful method which can be used to measure psychological constructs in natural language. This method will be of general interest to researchers and those concerned with understanding the attitudes and associations latent in text data.

4 - Predicting Hiring Decisions in Voice-to-Voice Interactions

Mariya Topchy, University of Connecticut, Storrs, CT
Debanjan Mitra

With only 5% of customer service interactions beginning with face-to-face encounters (Microsoft 2017) and growing popularity of services without physical locations to serve customers, voice-to-voice communications become

an essential touchpoint for both service providers and customers. In such interactions, voice represents the only medium of information exchange as communication partners are void of visual cues such as person's appearance, body language, facial expressions, etc. Indeed, the ability of voice to communicate information transcends linguistic content of the message. In social psychology, voice is known to reveal speaker's identify (gender, age, etc.), traits (attractiveness, credibility, expertise, dominance, etc.), and states (confidence, focus, affect, etc.). However, despite the informational power of voice, marketers still know little about how to utilize voice to better serve customers and improve business outcomes. Specifically, it is unclear how informative customer and service provider's voices are in predicting an encounter outcome and whether service providers can influence these outcomes through voice training or modulation. To examine the informational power of voice, we partner with a large U.S. law firm to obtain data on free phone consultations to, first, examine the predictive power of voice, and then examine what elements of the voice-to-voice interaction (evident from service provider's and client's voices) play the most critical role in determining the outcome of the interaction. Using machine learning techniques such as transfer learning and anomaly detection, we extract meaningful audio characteristics from raw soundwaves and use them to predict consultation outcome—customer's decision to hire a lawyer. We further employ interpretability techniques to identify which audio characteristics are the most powerful predictors and provide motivation for their predictive power.

TC08

Virtual Room 08
Brand and Channel Strategy
Contributed Sessions
Chair: Amrita Mitra
Ivey Business School, London, ON, Canada

1 - Should We Use Net Scores? Investigating Positive-negative Asymmetries in Brand Buzz, Quality, and Value

William Shibuya, University of Houston, Houston, TX
Rex Du

The authors present empirical regularities about positive-negative asymmetries in brand metrics, using panel autoregression and multinomial logistic regression to study 1,033 brands tracked for more than six years. Marketers frequently use net scores without accounting for potential differences in weights between the positive and negative sides of a metric. But should we use such net scores? Patterns

from two studies indicate we should weigh positive and negative ratings differently. The first study shows that the impact of changes on the positive side of brand metrics is stronger than changes on the negative side. The pattern is valid for changes in quality, value, and buzz and for their impact on purchase consideration and purchase intent. The second study shows that, for quality and value, the inertia of the positive side is higher than the inertia of the negative side regardless of brand rank. For buzz, the pattern depends on the rank: the inertia of the positive side is higher for lower-ranked brands but lower for higher-ranked brands, compared to the inertia of the negative side. Thus, there are positive-negative asymmetries in brand metrics that need to be accounted for to avoid bias when estimating their effects.

2 - Are Global Brands Less Authentic in Local Markets? The Influence of Local Indexicality and Local Iconicity on Perceived Global Brand Authenticity

Qianwen Ding, Guangdong University of Science and Technology, Guangdong, China

Recently, influenced by the resurgence of nationalism and increasing number of critical voices towards globalization (Liu et al., 2021; Mandler et al., 2020), consumers are turning to local products rather than non-local alternatives (Riefler, 2020). Nevertheless, the larger threat for global brands is its underlying influences on the perceived brand authenticity (PBA) (Liu et al., 2021). Although existing literature has examined the positive relationship between perceived brand globalness (PBG) and PBA (Özsomer & Altaras, 2008; Safeer et al., 2021), the influence of new global consumer culture context might reshape the mechanism of PBG and the way it interacts with PBA critically. Hence, by offering significant reflective views in a new globalization landscape, this study aims to investigate how PBG associates with PBA in local markets, and its impacts on brand preference(global vs. local). Moreover, despite incorporating local elements is one of the localized strategies for global brands, the effects of incorporating local elements on global brand authenticity evaluations remain unknown. Grounded on the research by Fritz et al. (2017), perceived cultural closeness contributes to brand legitimacy that enhances PBA. Therefore, drawing from Grayson & Martinec's (2004) research in semiotics as well, this study suggests that local elements embraced by global brands include local indexicality and iconicity that lead to enhanced authenticity evaluations, which positively associated with brand preference for global brands.In sum, engaging in a series of experimental studies, this research is expected to extend the theory of perceived brand globalness and brand authenticity under the potential weakened positive effects of globalization on international marketing. The study also adds

to authenticity literature through an empirical investigation of indexicality and iconicity in a context of glocal strategy. Besides, this study is expected to offer substantial managerial implications for global brand localization in a competitive landscape of global and local players.

3 - The Causal Impact of Mall Entry on Incumbents: Substitution, Agglomeration and the Key Role of Mall Positioning

Lu Feng, University of Electronic Science and Technology of China, Chengdu, China
Keyan Zhu, Cheng He, Tong Wang, Yu Jeffrey Hu

This paper studies the causal impact of mall entry on the incumbent malls. We conduct a quasi-experimental analysis by using a unique data set of traffic in 1,056 shopping malls. The results demonstrate that incumbents lose customer traffic by 3.4% after the entry on average. Heterogeneity analyses show that the incumbents that are closer to the entrants have fewer traffic losses. Specifically, the incumbents adjacent to the entrants have a traffic increase after the entry. The results also show that the entrants which are positioned as large-scale, low-priced, and newer brands cause more traffic losses to incumbents. Our findings shed light on the mechanisms driving mall customer traffic, namely agglomeration effect and substitution effect, as well as the role of mall positioning.

4 - How Well do Outlets' Early Days Predict Future Performance? Evidence From a Multinational Enterprise's International Expansion

Amrita Mitra, Ivey Business School, London, ON, Canada
Kersi Antia

Multinational enterprises (MNEs) often rely on local partners to establish new outlets in host countries. Our study provides a better understanding of these outlets' life cycles. Specifically, we seek to (i) ascertain the critical outlet transition points of takeoff (i.e. transition between the introductory and growth phases) and slowdown (i.e. transition between the growth and maturity phases), (ii) predict the outlet's sales in maturity as a function of its sales during its introductory phase, and (iii) emphasize the role of the host country-specific initial business environment to explain differences in how well outlets' sales in the introductory phase predict their sales in maturity. We use monthly sales performance data from a Canadian MNE for more than 400 outlets operated by nearly 300 local partners across 7 countries between 2003 and 2020. We integrate this data with additional information from six different databases for the same countries and over the same 18-year period on more than 100 indicators of host country-specific culture, economic freedom, ease of doing business, and political stability. We rely on Functional Data

Analysis to capture the outlets' introductory phase sales trends as functional principal component scores (FPCs). FPCs are predictors of outlets' sales in maturity; their interactions with host-country specific indicators represent the moderating role of the initial business environment. In predicting outlet sales well in advance, our study would help managers' resource allocation and life cycle management efforts. Our study will also help both parties understand key factors impacting future performance, thus providing them with effective levers of control.

TC09

Virtual Room 09
Advertising and Society
Contributed Sessions
Chair: Soogand Alavi
University of Texas at Dallas

1 - The Tucker Carlson Effect: Economic Consequences of Socio-political Activism

Rahul Suhag, University of North Carolina-Chapel Hill, Chapel Hill, NC
Rajdeep Grewal, Frank Germann

Tucker Carlson, TV host on Fox News, is popular for his right-leaning ideology and for making 'controversial' statements. Such statements have led to various activist groups calling upon brands to stop advertising during his show. We study the economic consequences of statements in which Carlson took a public stance on two prominent socio-political issues: Immigration (in 2018) and Black Lives Matter (in 2020). Using multisource data from Kantar Media and Nielsen TV, and employing a novel Bayesian synthetic difference in differences (BSDID) method, we estimate the impact of Carlson's controversial statements on not only his show's advertising revenue but also the supply-side (i.e., advertisers) drivers of that revenue. We find that Carlson's show lost advertising revenue following the first event in 2018. In contrast, advertising revenue did not decline following the second event in 2020. Mechanism analyses indicate that, following the 2018 event, the number of advertised brands on Tucker Carlson's show declined along with the cost of advertising, and even though each of the remaining advertisers was given a longer advertising window, it couldn't mitigate the effect. Supplementary analysis suggests that advertising brands became more homogenous and politically aligned (i.e., conservative) with Carlson's ideology, likely buffering the show from advertising losses following the 2020 event. Therefore, even though we see a decline in the cost of advertising following the 2020 event, the revenue does not decrease this

time around, as advertisers do not depart. These findings highlight the need for both the advertising channels and the brands to be even more diligent in their selection of strategic partners.

2 - Presidential Advertising Campaigns and Hate Crimes

Seulmin Yang, PhD candidate, Carlson School of Management, University of Minnesota, Minneapolis, MN
Linli Xu, Jason Chan, Yi Zhu

Presidential campaigns are the essential means for candidates to deliver their stance on key political issues, aiming to persuade voters that they deserve their individual votes. In the 2020 election cycle, the total campaign spending by all presidential candidates was over $4 billion, with TV advertising as the major medium. In the current study, we investigate whether the presidential campaigns have broader impacts on society beyond their influence on the voting outcome. Specifically, we use the 2012 and 2016 presidential elections to examine the relationships between presidential advertising spending and the number of hate crimes across 261 counties. The results indicate that presidential advertising campaigns by the democratic candidates have positive relationships with the number of hate crimes under both election cycles. In addition, more hate crimes are associated with counties where the republican party won the election and in states that traditionally support the republican party. Similar patterns are found across different types of hate crimes. These results imply that people, when exposed to ad campaigns by a presidential candidate of the opposing party, may act out or even conduct a crime, which suggests the need to closely monitor the unintended consequence of political campaigns.

3 - Gender Portrayals in Print Advertising: A Longitudinal Content Analysis

Edmund Hershberger, Associate Professor, Southern Illinois University Edwardsville, Edwardsville, IL
Michael Hair

The portrayal of women in advertising has been a long-studied phenomenon, with the seminal work being completed by Erving Goffman in 1976. This theory postulates that there are six categories of Gender Display in advertising: relative size, feminine touch, function ranking, ritualization of subordination, and licensed withdrawal. This theory has been revisited a number of times (Kang 1997; Bell and Milic 2002; Sharma and Bumb 2021). This study seeks two objectives: 1) to validate the Goffman categories in more current media, and 2) to detect social shifts from the 1960s to the 2010s as displayed through magazine advertisements. Following on established procedures for conducting content analyses

of advertising (Kassarjian 1977), we accessed published magazine advertising from the archive of Time magazine (www.time.com/vault/). A team of researchers accessed issues of Time magazine from each of the last five decades. For each decade, the first full page ad featuring a woman was selected from each month of the first five years of each decade, resulting in a total sample of 360 ads. The ads were split by decade among three coders, with each coder applying the category rubric suggested by Goffman (1976). We found that across most of Goffman's categories, use of the portrayal category significantly decreased throughout the period. However, the occurrences of the Infantilized Woman increased significantly throughout the period. Also, occurrences of Feminine Touch and Licensed Withdrawal declined overall throughout the period but increased from the 2000s to the 2010s.

4 - Assessing the Effectiveness of Digital Political Fundraising Ads on Facebook: Ad Delivery Algorithm, Impressions, and Ad Content

Soogand Alavi, The University of Texas-Dallas, Dallas, TX
Ying Xie, Shervin Tehrani

Digital political ad spending increased by 16% in the 2020 US presidential election compared to 2016, with a vast majority of this budget being spent on social media ads that solicit political donations. We contribute to the political advertising literature, which prior to this work has only examined voter persuasion ads on TV, by studying the effectiveness of digital fundraising ad copy designs given political advertisers' targeting strategy. The empirical challenge of this study is the potential bias induced by a non-random targeting practice of Facebook's proprietary ad delivery algorithm. In other words, the exposed users that create the total impressions that we observe as a researcher or advertiser, are chosen by the algorithm based on how likely they are to engage with a given ad content. Therefore, comparing the final impressions of different ad copies (that target the same population) may not be a fair comparison since the users were not chosen randomly. To address this challenge, we train a random forest model that can predict the impressions of an ad if the ad delivery algorithm had not played a role in choosing the optimal user for ad exposure based on ad content. By studying Biden and Trump's digital fundraising ads during the presidential election of 2020 using advertising data from Facebook's Ad Library and donation data from FEC, we find that ad content indeed plays an important role in ad effectiveness: ad elasticity varies depending on the tone, fundraising appeals, and state customization of the ad copy. We also find that without correcting for Facebook's ad delivery algorithm, elasticities are overestimated which is aligned with the reported bias direction in the literature.

TC10

Virtual Room 10
Online Consumer Privacy II
Special Sessions
Chair: Klaus Miller
HEC Paris, Jouy-en-Josas, France
Co-Chair: Bernd Skiera
Goethe University Frankfurt, Frankfurt, Germany

1 - Optimal Service Configuration for Digital Newspaper Providers: Consumer Preferences and Willingness to Pay for Informational Privacy
Felix Eggers, University of Groningen, Groningen, Netherlands
Nils Wloemert
We conducted an incentive-aligned choice-based conjoint analysis and a consequential validation study among customers of an Austrian news publisher to capture consumers' price and privacy trade-offs. We find a substantial willingness-to-pay for informational privacy, which exceeds the monetary valuations for news contents and formats. Our results suggest that privacy-based subscriptions mainly appeal to users of free ad-funded offers and thus increase total revenues.

2 - Can Privacy Protection be Profitable
Gilian Ponte, University of Groningen, Groningen, Netherlands
Tom Boot, Thomas Reutterer, Jaap Wieringa
Marketing's motivation to spend every dollar efficiently has resulted in the large-scale collection of personal information fueling an unprecedented detailed level of targeting. Such practices are experienced by customers as intrusive and give rise to privacy concerns—making policymakers and firms grapple with consumers' privacy protection (e.g. Digital Services Act). Research has shown that existing privacy protection approaches are ineffective in protecting consumers' privacy. In this study, we propose a methodology that allows marketers to collect personal information and target consumers with a mathematical definition of privacy protection: differential privacy. Importantly, we aim to quantify the effect of differential privacy on privacy concerns, the willingness to disclose information and the profitability of marketing campaigns. Our findings aim to inform public privacy policy, managers and the scientific community. If differential privacy alleviates the intrusiveness that targeting invokes, firms can protect individuals' privacy while possibly increasing targeting's profitability. Conversely, policymakers might consider to mandate differential privacy and protect consumers' privacy.

3 - Balancing User Privacy With Predictive Insights in Mobile Location Data
David A Schweidel, Emory University, Atlanta, GA
Tal Shoshani, Peter Pal Zubcsek
Mobile location data offers granular detail into consumers' mobility patterns. The detailed nature of the data, however, can reveal sensitive information about consumers based on the places that they visit, such as healthcare facilities, social connections or educational institutions. Using device-level data from a location data provider, we examine the extent to which predictive performance is affected by grouping individuals into homogeneous clusters that afford increased privacy. In our empirical context, we find that some level of aggregation results in higher predictive accuracy.

4 - Pay-or-consent: Analyzing the Attractiveness for Publishers to Obtain Consent with Tracking-free Paywalls
Timo Mueller-Tribbensee, Goethe University Frankfurt, Frankfurt, Germany
Klaus Miller, Bernd Skiera
For the collection of personal data, European privacy regulation requires publishers to obtain consent. However, asking users for consent via consent banners often results in users refusing consent. Thus, publishers increasingly adopt a solution, which forces users to either (a) pay for not being tracked or (b) consent to access the publishers' content. We study the attractiveness of obtaining consent with such tracking-free paywalls.

TC11

Virtual Room 11
Social Impact and Effects
Contributed Sessions
Chair: Rachel Ramey
University of Georgia, Athens, GA

1 - Pump Priming Markets at the Base of the Pyramid: A Randomized Controlled Trial of Push vs. Pull Strategies in Rural India
Gaurav Mehta, University of Cologne, Cologne, Germany
, Rajesh Chandy, Werner J Reinartz, Om Narasimhan
This paper offers new insights on the marketing of new socially beneficial product categories to rural emerging market communities. Such categories are those where it

is not even clear that demand exists (often due to lack of awareness), and a thriving marketplace of transactions most assuredly does not. We introduce the concept of pump priming: the stimulation of sales of a product category through early investments in marketing activities that educate consumers about problems created by current behaviours, and the advantages of new consumption behaviours. The ability to prime the pump for socially beneficial products could help address market failures that are often prevalent at the bottom of pyramid. We study the concept of pump priming through a randomized controlled trial involving 25,200 households in 240 rural villages in Uttar Pradesh, India. We specifically examine the impact of two marketing approaches that are particularly salient to such contexts and compare them to the traditional approach of selling through retail shops:a) community pull, defined as marketing efforts that seek to influence purchase and use behaviour among consumers through activities and events that draw large groups from the community (e.g., community rallies).b) consumer push, defined as marketing efforts that incentivize and support the targeting of specific segments of consumers to purchase and use products from new categories, with the expectation that these consumers will in turn influence others. Results suggest that direct marketing approaches involving consumer push and community pull marketing significantly outperform the traditional marketing approaches and could potentially help in address market failures that hinder the adoption of socially beneficial products.

2 - Customer Feedback, Employer Public Recognition, and Migrant Workers' Well-being: Nudges to Facilitate Social Sustainability

Ruhan Liu, Peking University, Beijing, China
Wanqing Zhang, Pradeep K. Chintagunta, Jing Xu
Migrant workers represent a significant part of the wage-earning population in the world and make remarkable contributions to the global economy. Above 200 million people live outside their home countries. In China, rural migrants contributed about 8.2% to the economic growth of the secondary and tertiary industries. However, many of them encounter difficulties in integrating into the local society and suffer from poor working conditions and job stigmatization. To improve front-line migrant workers' well-being, we use customer feedback and employer public recognition as nudges to help them better understand their job duties, build up self-esteem through others' recognition, and derive a sense of meaning and belongingness from their jobs. Empirically, we conducted a longitudinal field experiment among 153 front-line employees (the majority

of them are migrants) from an online household service platform in China. Key findings reveal that employees benefit from customers' positive feedback in terms of learning engagement, job motivation and ability, psychological well-being, and relationships with their employer. Furthermore, treatment effects are contingent on multiple factors, including employees' demographics (e.g., age, gender, education), prior job performance, baseline levels of well-being, and their employment relationships before our intervention. In addition, repeated interventions remain effective over time. Overall, our research provides insights into social sustainability, marketing for social impact, and supporting vulnerable workers.

3 - Do Women Pay More than Men for Indirect Auto Financing?

Cem Ozturk, University of South Carolina, Columbia, SC
Cheng He, Pradeep Chintagunta
We study whether, and if so, when women pay more than men for auto loans, the third most prevalent consumer debt category in the U.S. In theory, the availability of many lenders in the auto loan market could hinder markup discrimination between genders. However, consumer advocates have long maintained that the lack of transparency in dealer markups for indirect auto loans incentivizes dealers to charge what they think they can get away with, rather than what consumers are eligible for, based on their credit tiers. We show that dealers charge higher markups to women than men using detailed individual transaction-level data. We also find that the difference in dealer markups between female and male buyers is smaller for 1) women in census tracts with higher education levels, 2) younger women, and 3) women who trade in a car. The gender gap in dealer markups disappears in dealers in Democratic (vs. Republican) counties and for loans from captive lenders (i.e., financing arms of automakers). It diminishes as the number of financial institutions in the dealers' markets increases. It even reverses for the youngest group of women. These findings inform policymakers and consumers about the extent of the previously undocumented gender gap in indirect auto financing and situations more susceptible to unfair lending to women.

4 - Role of Identity Based Motivation in Replication of Non-traditional Women-run Financial Entity

Rachel Ramey, University of Georgia, Athens, GA
Sundar G Bharadwaj, Ellen McCullough
The nonprofit organization CARE International (Cooperative for Assistance and Relief Everywhere) has spent decades investing in developing Village Savings and Loan Association (VSLA) groups around the world to alleviate global poverty. These savings groups are comprised of 15-30 low income

members, mostly women, who are trained to collectively save money. It requires extensive monetary and human resources to form all the savings groups, and a desire to reach as many communities as possible while responsibly spending donor funds has encouraged CARE International to seek economical ways to increase the rate of new VSLA group formation, such as replication. Replication is when members of an existing savings group form a new savings group in their community without reliance on CARE resources. By applying the marketing concepts of intrinsic motivation and identity-based motivation, this research seeks to increase the replication rate of savings groups thus increasing their reach and global impact. This study reports the results of a large-scale randomized controlled trial (RCT) conducted with a sample of 1120 VSLA savings groups in Malawi using a replication training intervention. This research contributes to the marketing literature by examining identity-based motivation as a non-monetary incentive in a field setting over a long time period.

TC12

Virtual Room 12
Consumer Behavior III
Contributed Sessions
Chair: David Olk
University of Groningen, Groningen, Netherlands

1 - Rating Service Professionals First Reduces Tip Amount in Sequential Decisions

Jinjie Chen, City University of Hong Kong, Hong Kong
Alison Jing Xu, Maria A. Rodas, Xuefeng Liu

Tips play an important role in the economy. In U.S. restaurants, $47 billion is tipped annually (Azar, 2011), and tips often represent over half the income of people working in the food-service business (PayScale, 2015). As the COVID-19 Pandemic led to an exponential increase in the popularity and importance of app-based services, such as food and grocery deliveries (Huet & Chapman, 2020), tipping is an important income source for service professionals in more industries. New technological advances pose new questions to be answered. For example, as rating service professionals become more prevalent (e.g., Uber, Instacart), how would the order of rating and tipping affect each other? We propose that rating a service professional first decreases tip amount, based on two theory-driven assumptions. First, tipping (i.e., parting with money) is economically costly and psychologically painful, and, hence, aversive (Prelec & Loewenstein, 1998). Second, people can flexibly categorize things based on their needs and goals (Poynor & Haws, 2009).

Therefore, when consumers have the opportunity to rate the service professional first, they can categorize both ratings and tips into one category of rewards to the service professional. As the result, they feel justified to tip less. However, since rating is costless, tipping first would not influence how people rate. We demonstrated this effect in seven studies, including two field studies, one secondary-data analysis, and four lab experiments. Indeed, rating first led to smaller tip amounts, and tipping first did not influence ratings. The findings contribute to the literature of tipping, categorization, and sequential decision making. Our results can also help firms design better consumer decision architecture for their platforms.

2 - Does Trust Matter? Examine Trust in Relationship Between CSR and Consumer Buying Behavior

Meilia Natalia, National Chung Hsing University, Taichung, Taiwan

CSR has had an impact on many companies and shows promising results in generating revenue. Trust can have an impact on the success or failure of socially responsible companies in the marketplace. CSR activities help generate trust among consumers. In this study, the authors use affect-based trust, cognition-based trust, and disposition-based trust to analyze the relationship between CSR and consumer buying behavior. This study aims to examine trust when placing between CSR and consumer buying behavior as a moderating variable. By using quantitative methods and through a questionnaire, 254 valid data were collected for analysis. This study proves a strong relationship between CSR and consumer buying behavior as well as between trust and consumer buying behavior. However, when the researcher tested trust as a moderator in this study, there was no significant evidence proving that trust had an influencing power in the relationship between CSR and consumer buying behavior. Trust, in this study, was examined as a predictor moderator through several tests and analytical procedures.

3 - How Popular is the Usage of Technology-based Payment among Retail Store Owners and Consumers?

Dr Rajesh Kumar Srivastava, Sydenham Institute of Management University of Mumbai, Mumbai, India
Dr. Shriniwas Dhure

The study compares the acceptance of technology-based payment among Mom-and-Pop retail (small retailers) owners, and consumers; patronising the same, as technology-based payment is still a problem area in emerging markets like India. Four hundred and eight participants in the consumer category, and two hundred and twenty participants in the

retail category participated in this study. Acceptance of technology-based payment among Mom-and-Pop store owners and consumers patronising the same in emerging markets such as India is influenced by experience and service charges of the technology-based payment. Results of the study can help mobile payment companies understand factors that are relevant to increasing adoption of technology in the context of merchants and consumers of. The Rational-Adoption theory (R-A theory) is used to explain the comparative study of digital adoption mode of payment among owners and consumers by combining theory of diffusion of innovations (Roger, 2003) and the rational choice theory (Allingham, 2002

4 - Absolutely Unhealthy, Relatively Healthy: The Effect of Consumer Reference Points in Evaluating Front-of-package Nutrition Labels

David Olk, PhD Candidate, University of Groningen, Groningen, Netherlands

Koert Van Ittersum, Tammo H Bijmolt

Health issues related to food consumption pose an increasing threat to people worldwide (WHO, 2018). In response, so-called front-of-package labels (FOPLs) have been introduced to provide consumers with a simple and summarized indication of a product's nutritional value at the point of sale. Meta-analyses of previous studies show that while FOPLs increase the purchasing of healthy products, the health perception and purchasing of unhealthy products is not reduced (Cadario & Chandon, 2020) and even increases in some studies (Ikonen et al., 2020). Previous literature has failed to provide an explanation for these adverse results. Using prospect theory, we argue that consumers' unexpected responses to the introduction of FOPLs can be explained by their internal healthiness reference point towards a certain product. If a product performs better (worse) relative to the consumers' reference point, consumers perceive an increased (decreased) utility of that product.We test our hypotheses with two datasets. First, we analyze a dataset containing two years of weekly in-store sales data of a large Dutch retailer. We model each person's health reference point for selected product categories based on the pre-FOPL-introduction purchases (year 1) and analyze how they affect post-introduction purchases (year 2). Second, we validate the in-store experiment in an online survey including a health-rating and purchasing task. We test the effect of health reference points on purchase likelihood using a latent-class multinomial logit model.The envisioned scientific contributions of this paper are that it (1) uniquely integrates existing theories on the effects of reference points into the health intervention domain, (2) tests the robustness of earlier findings on the effect of reference points, (3) yields novel and unique insights into the existence and accuracy of reference points with regards to the healthiness of products, and (4) offers a missing understanding about the asymmetric effects of health-based FOPL on healthy versus unhealthy products.

TC13

Virtual Room 13
Social Media: Social Media Engagement
Contributed Sessions
Chair: Lena Song
NYU, New York, NY

1 - How to Mitigate the Negative Effects of Competitors' Black Lives Matter Activism on Social Media: Coupling Natural Experiments and Machine Learning

Marco Qin, Temple University, Philadelphia, PA

Yang Wang, Xueming Luo

The recent Black Lives Matter (BLM) movement shocked our society and reached a dramatic climax with over 450 major protests spanning across the globe. Our research quantifies the causal impact of competitors' BLM activism on a focal brand and examines how to mitigate the possible negative impact for the focal brand. We use a difference-in-differences modeling approach and advanced machine learning algorithms (GAN-BERT) to analyze unstructured social media textual data by taking advantage of the Blackout Tuesday, an event during which numerous brands expressed BLM solidarity by posting black squares on Instagram, but not Twitter, as a natural experiment. Based on a unique dataset involving 312 brands from the competitive and concentrated fashion industry and 225,918 social media posts, we find a significantly negative impact of competitors' BLM postings on focal brands' social media engagement. Relative to their Twitter accounts without Blackout Tuesday posts, focal brands whose competitors supported the Blackout Tuesday BLM event on Instagram gained 36% fewer followers and experienced an additional 15% decrease in consumer liking. Fortunately, focal brands can assuage such a negative impact of competitors' BLM activism through a battery of mitigation approaches. From a top-down approach, brands that build a large number of social media followers and whose close rivals are not intensely engaged in BLM activism are less prone to this negative impact. Furthermore, from a bottom-up approach, focal brands can leverage pre-emptive BLM postings prior to the event to mitigate the negative impact. Interestingly, another bottom-up approach of using follow-up copycat BLM posts by the focal brand immediately after its rival brands' activism backfires even more when the top-down

factor of rival BLM activism intensity is high; however, if the focal brand is late to the BLM movement but still wants to support social justice causes, it can do so to show its moral obligations and not suffer from the negative impact when competitors' activism intensity is low.

2 - Firm Responses to the Content and Emotions Expressed in Social-Media Word of Mouth

Aishwarrya Deore, Michigan State University, East Lansing, MI

This study examines the influence of content and emotional feedback expressed through social-media channels on 1) firm revenues and consumer purchasing decisions, 2) firm quality outcomes, and 3) firm operational and resource allocations. Using psychology theory as a framework and textual analyses methods, I classify web scrapings of millions of social media posts for 19 US airlines for the 2007-2019 period based on its cognitive content and emotional type. I identify social media word-of-mouth (SWOM) feedback about five quality-related themes based on their emotional type. The results show that negative and non-negative quality-related SWOM impact consumer and firm outcomes. Firm revenues and consumer volume decrease (increase) following negative (non-negative) quality-related SWOM. Firms improve quality outcomes following negative quality-related SWOM. Firms also alter the level of operations, change pricing strategies, and enhance quality-cost investments following quality-related emotional SWOM. This research highlights the usefulness of SWOM as a source of customer feedback for firms and its decision-facilitating role and provides evidence that firms incorporate both the content and emotional type of customer feedback in their management control design. It also contributes to the marketing literature on the socio-economic impact of SWOM on consumers and firms alike and sheds light on product design choices that change in response to SWOM.

3 - Visual Luxury Appeals: The Role of Extended-self and Hedonism for Social Media Engagement

Yuqiao (Yuqi) Liang, University of New South Wales, Sydney, Australia
Jun Bum Kwon, Zhenyu Wang, Yichen Liu, Ka Wing Chan, Felix Septianto

Since the pandemic outbreak, the online demand for luxury products has been growing sharply, despite their high price. In response, luxury companies invest more in their social media marketing to attract consumers. We investigate the effective dimensions of luxury appeals across different luxury product categories. By utilizing state-of-art AI service, we detect two personal luxury dimensions: extended-self and

hedonism from 65,000 images across 10 luxury fashion and 10 luxury hotel Instagram accounts. We find that an extended-self appeal is effective for luxury fashion, while a hedonism appeal is so for a luxury hotel. We discuss the theoretical and managerial implications. Keywords: luxury dimension, hedonism, extended-self, social media

4 - The Heterogeneous Effects of Social Media Content on Racial Attitudes

Lena Song, NYU, New York, NY

Social media content has the potential to either bring people together or push them apart. I formalize a model that predicts an inverted-U relationship between the content's persuasiveness and its distance from the reader's existing beliefs. Using online survey experiments, I expose U.S. adults with varying racial beliefs to social media content supporting racial justice. Racial moderates are persuaded and become more progressive after the exposure to moderately progressive content. The same content has little effect on racial progressives and conservatives, and extremely progressive content generates a backlash for racial conservatives. Racial conservatives and moderates rate more progressive content as less informative, less reliable and more objectionable. These findings provide causal evidence that racial justice content can be persuasive and highlight the importance of tailoring content in persuasion.

TC14

Virtual Room 14
Advances in Demand Estimation
Special Sessions
Chair: Giovanni Compiani
University of Chicago, Chicago, IL
Co-Chair: Ilya Morozov
Stanford University, Stanford, CA
Co-Chair: Stephan Seiler
Imperial College Business School, Londdon, United Kingdom

1 - Demand Estimation with Pairwise Variables

Stephan Seiler, Imperial College Business School, London, United Kingdom
Giovanni Compiani, Ilya Morozov

We propose a model of demand that allows utility to be correlated as a function product-pair level variables, such as how similar product labels are or how similar customer reviews are between different products. To incorporate these variables into a discrete choice demand framework, we estimate a paired combinatorial logit model where

each product is in a separate nest with every other product and allow the nesting parameters to depend on pairwise variables. Our framework is computationally light and does not require simulation, implying that it can be applied to online settings where assortments are often large and rich information on product similarity can be gleaned from various sources. We apply the model to data from an online wine merchant, estimate demand for 50 products and show that pair-specific variables are helpful to estimate a flexible cross-price elasticity matrix.

2 - Heterogeneous Position Effects and the Power of Rankings

Rafael P. Greminger, Tilburg University, Tilburg, Netherlands

Most online search intermediaries and online retailers present products on product lists. By changing the ordering of products on these lists (the ranking), these online outlets can increase revenues at a potential cost to consumer welfare. This paper shows that rankings increase revenues through the differential impact of higher list positions on purchases of heterogeneous products, and provides empirical evidence for heterogeneity in these position effects. To quantify consumer welfare effects, I develop an estimation procedure for the search and discovery model of Greminger (2021). Counterfactual simulations highlight that - because of the complementarity in attributes and the position on the list - revenue-based rankings reduce consumer welfare only to a limited extent.

3 - Combining Choices and Response Times in the Field: A Drift-diffusion Model of Mobile Advertisements

Khai Chiong, University of Texas-Dallas, Richardson, TX
Ryan Webb, Matthew Shum

Endogenous response time data is increasingly becoming available to applied researchers of economic choices. However, the usefulness of such data for preference estimation is unclear. Here, we adapt a sequential-sampling model -- previously-validated to jointly explain subjects' choices and response times in laboratory experiments -- to model users' responses to video advertisements on mobile devices in a field setting. Our estimates of utility correlate positively with out-of-sample measures of ad engagement, thus providing external validation of the value of incorporating endogenous response time information into a choice model. We then use the model estimates to assess the effectiveness of manipulating attention towards an advertisement. Counterfactual simulations predict that

requiring users to watch some portion of the ad -- as is the practice of some online platforms (e.g. YouTube) -- generate only modest increases in click-through rates and revenue.

4 - Shrinkage Priors for High-Dimensional Demand Estimation

Adam Smith, University College London, London, United Kingdom
Jim Griffin

Estimating demand for wide assortments of differentiated goods requires the specification of a demand system that is sufficiently flexible. However, flexible models are highly parameterized so estimation requires appropriate forms of regularization to avoid overfitting. In this paper, we study the specification of Bayesian shrinkage priors for price elasticity parameters within a log-linear demand system where the number of price elasticity parameters grows quadratically in the number of goods. Traditional regularized estimators shrink regression coefficients towards zero which can be at odds with many economic properties of price effects. We propose a hierarchical extension of the class of global-local priors commonly used in regression modeling to allow the direction and rate of shrinkage to depend on a product classification tree. We use both simulated data and retail scanner data to show that, in the absence of a strong signal in the data, estimates of price elasticities and demand predictions can be improved by imposing shrinkage to higher-level group effects rather than zero.

Thursday, 12:45pm–1:45pm

TD01

Virtual Room 01
Game Theory III
Contributed Sessions
Chair: Fei Long
University of North Carolina at Chapel Hill, Chapel Hill, NC

1 - Demand Uncertainty and Sales Force Compensation Design

Rob Waiser, Assistant Professor, London Business School, London, United Kingdom
David Soberman

Standard models of sales force compensation design (e.g. Basu et al, 1985) indicate that the convexity or concavity of the optimal compensation plan (i.e., whether commission rates increase or decrease with sales) depends on the risk

aversion characteristics of the salesperson. In this research, we propose an alternative mechanism that can drive the shape of the optimal compensation curve in practice -- demand uncertainty and asymmetric information. We use a game theoretic model to examine optimal sales force compensation design when a risk-neutral firm and salesperson face uncertainty about the demand for their product at the time of contracting. After the contract is signed, the salesperson learns about the demand conditions and can adjust her selling effort accordingly. We find that the shape of the optimal commission curve depends on how selling effort affects the probability distribution of sales outcomes, given demand conditions. For example, it may be the case that under low demand, salesperson effort mainly shifts probability from low to intermediate sales outcomes, while under high demand conditions, effort primarily shifts probability from intermediate to high outcomes. Alternatively, high demand might imply that the product sells itself, in which case effort is less impactful than under low demand. In general, we find that increasing commissions are optimal only when the effect of selling effort on the likelihood of high outcomes is sufficiently large regardless of the demand condition. When effort primarily drives intermediate outcomes under either high or low demand, decreasing commissions are optimal. We also identify a range of conditions under which piecewise commissions perfectly manage asymmetric information and elicit efficient effort from salespeople.

2 - How Can Publishers Collaborate and Compete With News Aggregators?

Jinzhao Du, The University of Hong Kong, Hong Kong
Wilfred Amaldoss

Publishers face an existential threat from a variety of news aggregators, such as free aggregators (e.g., Google News, Yahoo! News), micropayment-facilitating aggregators (e.g., Blendle) and subscription-charging aggregators (e.g., Apple News+). We seek to theoretically examine whether publishers can collaborate and compete with the different types of news aggregators and, if so, what pricing and content-sharing strategies should publishers pursue. In the absence of a news aggregator, publishers sell their content as a composite publication; this intensifies inter-publisher price competition and hurts publishers' profits. A free aggregator, however, could help unbundle the articles of a publisher. Moreover, the free aggregator can completely eliminate inter-publisher competition if publishers share articles on the same topic with it, and partially eliminate inter-publisher competition if they share articles on different topics with it. Yet, the free aggregator needs to bring sufficient additional traffic to the publishers to motivate them to share content and collaborate with it. Conversely, publishers will be willing to collaborate with a micropayment-facilitating aggregator

even if it does not bring additional traffic to the publishers. This is because a micropayment-facilitating aggregator helps publishers to unbundle their content and price discriminate. Lastly, publishers can be motivated to collaborate even with a subscription-charging aggregator that is powerful enough to dictate the terms of the revenue-sharing arrangement with the publishers. This is because the subscription-charging aggregator improves its profits without hurting the publishers' surplus.

3 - Pricing Sustainable Products

Siddharth Prusty, Duke University, Durham, NC
Wilfred Amaldoss

Consumers care about sustainability and the environment, and this growing concern is reflected in their purchase decisions. In response to these shifts in consumer mindset, firms are taking several initiatives to improve the impact of their products on society and environment. However, knowing that investments in sustainability come at a cost, it is a priori unclear whether such investments add to a firm's profits, especially in the presence of competition. Moreover, how should a firm price a product with a sustainability claim? To explore these questions, we propose a theoretical model for pricing of sustainable products in a horizontally differentiated market. We explore two alternate mechanisms by which investments in sustainability can affect purchase behavior: (1) by increasing consumer valuation for the product, or (2) by increasing consumer demand for the product without influencing valuation. Under both mechanisms, we solve for equilibrium sustainability investment and price. Our model allows for heterogeneity in consumer preferences for sustainability.Our analysis yields some counter-intuitive results. We find conditions under which equilibrium price can be independent of the proportion of consumers valuing sustainability, while firm profits can be decreasing in this measure, due to firms facing a prisoner's dilemma. We explore how diversity in consumers' taste affects equilibrium, finding conditions that can lead to both increase or decrease in prices and profits. Finally, we compare equilibrium sustainability investment in a free market as compared to the total welfare maximizing investment level. We see that firms might tend to over-invest in a free market, with both firm profits and consumer surplus as higher in a free market than in a regulated market.

4 - Fake Sales and Ranking Algorithms in Online Retail Marketplace With Sponsored Advertising

Fei Long, University of North Carolina at Chapel Hill, Chapel Hill, NC
Yunchuan Liu

We study the optimal algorithm decisions of a platform on ranking products sold by sellers--who may use fake sales to boost the rankings of their products--and the impact on consumers and sellers. We design a model of an online retail marketplace with competing sellers. The platform decides whether to tolerate fake sales and whether to rank its organic results based on sellers' qualities or popularities. The sellers decide whether to buy fake sales and how much to bid for sponsored advertising on the platform. We show a platform may strategically tolerate or even encourage popularity-boosting fake sales by a seller when the seller's quality level is extreme relative to competitors. With a low-quality seller, allowing fake sales may benefit the platform through reducing differentiation between sellers and intensifying competition for the sponsored ads (i.e., feeding the puppy dog). With a high-quality seller, it benefits the platform by increasing differentiation between the two sellers and softening price competition, which improves the platform's commission revenue (i.e., feeding the fat cat). Furthermore, fake sales may benefit consumers by increasing price competition and may also benefit competing sellers by reducing the high-quality seller's dominance.

TD02

Virtual Room 02
Decision Making under Uncertainty
Contributed Sessions
Chair: Yuanfang Lin
University of Guelph, Guelph, ON, N1G
2W1, Canada

1 - The Mechanisms of Moral Trade-offs in Life-saving Medical Triage Decisions
Siyuan Yin, The Wharton School, University of Pennsylvania, Philadelphia, PA
Nicolette J Sullivan, Walter Sinnott-Armstrong, Scott A Huettel
Many real-world decisions are difficult because they require tradeoffs between moral principles and utilitarian factors. For example, some hospitals have courted controversy for denying an otherwise eligible patient's claim of an organ transplant if they refuse to be vaccinated against COVID-19. Others may require six months of abstinence before a liver transplant. Here, in a laboratory study, we investigate participants' organ transplant decisions based on utilitarian (post-transplant life expectancy) and moral (past lifestyle decisions) attributes. We vary the utilitarian benefit as well as the moral valence (the patient is either praiseworthy or blameworthy) to estimate tradeoffs between these two

attributes. Further, in some cases-as in real life-a patient who had already been designated to receive an organ is reassessed in light of a new, perhaps more worthy, candidate. We implemented a series of Bayesian computational models to assess specifically how three variables influenced decisions: (1) the weight on expected post-transplant life expectancy, (2) blameworthiness or praiseworthiness, and (3) the bias toward a previously selected patient. The best model suggests that our participants make decisions based on post-transplant life expectancy, and more importantly, the moral valence of each patient's lifestyle (e.g., prior alcohol use). We further illustrate how eye gaze (assessed using eye-tracking) and decision process parameters (assessed using drift diffusion modeling) influence the decision-making process to result in trade-offs between moral and utilitarian attributes. These also allow us to understand when and how previously-selected patients gain an advantage in choice, independent of these attributes.

2 - What Drives the Likelihood of Consumption After Purchase
Henri Defoor, KU Leuven, Antwerpen, Belgium
Kathleen Cleeren, Neomie Raassens, Jeff Inman
Traditional economic theories assume that grocery purchases and consumption are perfectly in sync. However, in reality, consumers are often unable to align product purchases and consumption due to insufficient planning, impulses from the shopping environment, or poor food management. As a result, consumers may buy products they eventually do not consume. This raises the question which factors drive the likelihood of consumption after purchase. We have access to a unique single-source dataset which combines information from consumption diaries and purchase scanner data for the same panel of households (n = 4,677). Using a random-effects proportional hazard model, we examine the impact of product category-, household-, and purchase occasion characteristics, which are linked to product preference and cost considerations that consumers may have at the moment of consumption, on consumption likelihood. We find that the likelihood of consumption is 5.6% lower if a grocery product is purchased during a major shopping trip (compared to a fill-in trip) or 15.1% lower when the purchased product was on promotion (versus a regular priced product). If a product belongs to a product category typically bought for breakfast or a more utilitarian category, consumption likelihood is, respectively, 93.8% higher and 17.2% lower than for products that belong to other categories. Furthermore, products bought by larger households are less likely to be consumed, while experience with the product category increases the consumption likelihood. Our research also points out that a higher unit price and a larger package size increases consumption likelihood with, respectively, 6.1% and 15.7% per unit.

3 - Impact of Individualism vs. Collectivism on Consumer Stocking Behavior

Yuanfang Lin, University of Guelph, Waterloo, ON, Canada
Hui Wang, Tirtha Dhar

The impact of COVID-19 pandemic has been unprecedentedly striking globally. Consumers' large quantity ordering and stockpiling have resulted in the inventory sold out experienced by many stores. Stockpiling driven by panic or information uncertainty may harm consumers' physical and psychological well-beings amid the pandemic. While disadvantageous consumers may lose their fair opportunities of accessing essential commodities due to other consumers' stockpiling behavior. This generates negative impact on social welfare. On the demand side consumers in making purchase decisions may have both non-cooperative and self-interested behavior (such as over stocking) mixed with some pro-social and cooperative acts (such as reducing purchase for others). On the supply side, in addition to inventory management stores are facing the challenges of disseminating information about product availabilities in order to help reduce consumer overstocking. This paper builds a stylized theoretical model to examine how consumers make purchase decisions bearing different levels of fairness concern regarding the impact of their stockpiling behavior on other buyers. We also study retailers' information disclosure strategies facing consumers whose shopping behaviour demonstrate more (or less) of individualism versus collectivism. Our analyses identify conditions under which it is optimal for a store to inform consumers of the product inventory level. Facing the uncertainty of product availability in future periods, a consumers' overstocking decision is found to be driven by the perceived store inventory, the stocking cost, the value of extra units in future consumption, as well as degrees of fairness concern in consumption utility. Findings from this research will provide important guidance for government and business organization to develop effective policies and communication strategies that help combat misinformation, reduce the propensity of overstocking and food waste when the society is facing and adapting to a highly disruptive and long lasting event such as the COVID pandemic.

TD03

Virtual Room 03
Influencer Marketing IV
Special Sessions
Chair: Andreas Lanz
HEC Paris, Paris, France
Co-Chair: Isabelle Engeler
ESADE Business School, Barcelona, Spain

1 - Theorizing the Influencer Industrial Complex

Gillian Brooks, King's Business School, London, United Kingdom

The marketing industry has seen a shift in how consumers discover new products. The rise of social media influencers has fundamentally changed the consumer decision journey and marketers are struggling to find their place in this evolving landscape (Childers, Lemon & Hoy 2019). The influencer marketing industry is projected to be worth $26.4 billion by 2025 (Mansour 2020) and has given rise to new pathways for everyday individuals to accrue media attention, which can be translated into promotional endeavours (Brooks, Drenten and Piskorski 2021). The rise of influencer marketing has gained recognition in various academic literatures, which had previously focused on opinion leaders and market mavens (Goldenberg, Lehmann, Shidlovski & Barak 2006; Lazarsfeld, Berelson and Gaudet 1944), influence through celebrity endorsements (Dwivedi, McDonald and Johnson 2014) influence through word-of-mouth marketing (Chae, Stephen, Bart and Yao 2015; Hughes, Swaminathan and Brooks 2019) or testimonials in advertising (Martin, Wentzel and Tomczak 2008). Recently, scholars have developed a more robust understanding of who these online influencers are (Brooks, Drenten and Piskorski 2021; De Vierman, Cauberghe and Hudders 2017) but minimal research has examined this precarious system. Our study seeks to provide a systematic review of what we have termed the Influencer Industrial Complex - the evolving infrastructure and the key players that have created this unique space. We ask specifically: how has this industry evolved into a multi-level marketing scheme, and who are the key players that structure it?

2 - Luxury Content Becomes Viral on Social Media: The Positive Role of Disfluency

Zitian Qiu, PhD Student, HEC Lausanne, Lausanne, Switzerland
Felicitas Morhart

Luxury brands nowadays create social media content that they hope their audiences will share to increase brand awareness. Existing studies suggest that firms should create fluent content (e.g., using shorter sentences and simpler vocabularies) to ensure content virality, but we propose this strategy does not fit luxury brands. By analyzing 3,695 Facebook posts published by luxury and mainstream brands from different product sectors during 2017-2019, we find that disfluent content using longer sentences and more infrequently used vocabularies, if published by luxury (mainstream) brands, receives more (less) shares. We believe the psychological mechanism behind this effect is that

disfluent (vs. fluent) content is perceived more psychologically distant, and hence better satisfies luxury audiences' status desires for differentiating themselves from the masses.

3 - Be Careful What You Look for: Biased Brand Portrayal in Social Media

Julia Rosada, University of Hamburg, Hamburg, Germany
Jochen Hartmann, Jasper Schwenzow, Mark Heitmann
User attention in social media has long shifted from text to images. These images often contain brand logos in various intended but also unintended contexts. The amount of such brand imagery continues to proliferate, making it challenging for marketing research and practice to keep track of how brands appear online. The most intuitive approach is to search brand hashtags (e.g., #heineken) and study all related images. However, less than 20% of branded user-generated content contains a brand hashtag, leaving the remaining 80% unconsidered. To investigate a potential bias, we use deep convolutional neural networks for image classification and object detection and analyze more than 200,000 brand image posts with and without hashtags, originating from Twitter, covering more than 150 brands. We find that users are more likely to add hashtags to images with bigger and more central logos as well as to those with higher quality image characteristics (e.g., saturation, brightness). Conversely, objects on the image that compete with brand visibility result in fewer hashtags. These differences have consequences in terms of viewer response. Specifically, a lab experiment suggests that the types of images consumers typically tag obtain higher purchase-intention ratings compared to the types of images that remain untagged. We also find that brands have differential hashtag potential such that brands with higher levels of user interest feature a higher share of hashtag images. We discuss the relevance of scalable logo detection to remedy the resulting biases of social media data collection.

4 - From Mix-and-match to Head-to-toe: How Brand Combinations Affect Observer Trust

Isabelle Engeler, IESE Business School, Barcelona, Spain
Kate Barasz
Consumers use brands in many combinations, from mixing-and-matching multiple brands (e.g., Nike shoes, Puma shirt, and Asics shorts) to using products primarily or solely from one brand (e.g., Nike shoes, shirt, and shorts). This work explores how such combinations affect observers' trust in another consumer's recommendations. Comparing two combination types—mixed-brand combinations (where all/most branded products are from different brands) and dominant-brand combinations (where all/most branded products are from the same brand)—nine studies establish

that observers tend to have less trust in recommendations from those who use dominant-brand combinations (studies 1A-1C). This is driven by inferences about how the products were chosen: observers believe others who use dominant-brand combinations placed relatively greater importance on the brand— a feature that often serves as a mental shortcut for choices—and therefore infer these consumers made quicker, less thoughtful decisions (studies 2A and 2B). While the effect diminishes when observers hold particularly favorable attitudes toward the focal brand (study 3), it can alter observers' own downstream behaviors (e.g., social media following intentions, information seeking, and recommendation taking; studies 4A-4C). Together, the findings confirm that brand combinations elicit responses distinct from single brands, offering fruitful avenues for future research.

TD04

Virtual Room 04
Sales Force Management and B2B II
Contributed Sessions
Chair: James Reeder
Purdue University - Krannert School of Management, West Lafayette, IN

1 - Why Are Revenue Contracts So Ubiquitous?

Kissan Joseph, University of Kansas, Lawrence, KS
Murali Mantrala, Paul Parker, Alex Thevaranjan
Sales organizations seek margins but often reward revenue. This disconnect is puzzling and has not escaped commentary. Accordingly, in this research, we ask: what metric should compensation contracts be based on: margins, revenue, or separate commissions for price and quantity? We develop a two-effort model where the first effort (quality) helps the salesperson garner a high price whereas the second effort (quantity) drives the number of customer transactions. We obtain three key results. First, when the salesperson does not control price, margin contracts are equivalent to revenue contracts in terms of efforts and profits. Second, we offer a conditional insight. In high value-added consultative environments, firms concerned about the adverse impact of negotiations may actually prefer revenue contracts because the fractional profit degradation of revenue contracts could well be lower than the fractional loss from negotiations. In contrast, firms concerned about the fixed cost of collecting margin information may prefer margin contracts because the absolute profit degradation of revenue contracts could likely exceed this fixed cost. Finally, we demonstrate that separate commissions on price and quantity perform

substantially worse than either a margin contract or a revenue contract. Even though its ability to precisely control each effort might, at first blush, seem to be an ideal theoretical solution, the choices of the salesperson here with respect to price and quantity are too far removed from the margin optimization desired by the firm. We believe this last finding parallels the double marginalization finding reported in the channel literature.

2 - Business-to-business Sales Opportunity Management: A Framework, Evidence and Application

Muzeeb Shaik, PhD Student, Texas A&M University - College Station, College Station, TX
Shrihari (Hari) Sridhar, Vikas Mittal

To meet sales targets with finite resources, business-to-business (B2B) sellers need to prioritize promising sales opportunities from a large pipeline of possibilities. Extant evidence in theory and practice suggests that B2B sellers use arbitrary or gut-based decision rules to prioritize sales opportunities, which leads to sub-optimal sales opportunity management. We draw from the relationship management and organizational buying literature to build a conceptual framework relating buyer-class typology (e.g., new bid vs. modified rebid), and opportunity characteristics (e.g., opportunity size) to a seller's decision to bid, and the bid outcome. We test the framework using archival data from a major B2B on-site services provider. The data span sales outcomes (did not bid, bid and won, bid and lost) for 4,564 sales opportunities, spanning 10 years, and 23 countries. Model-free evidence indicates an ongoing tension in sales pursuit: while the best projects to bid on are ones with the best buy-class typology (e.g., straight rebid) and lowest risk (e.g., small opportunity size), such opportunities are not enough to grow the sales in each region. Accordingly, we first develop an ensemble machine learning framework to predict the focal seller's propensity to win the opportunity, as a function of complex non-linear interplay among the sales opportunity characteristics. Subsequently, we build a combinatorial approach that allows a company to take the right level of risk (i.e., some new bids, some large opportunities) so that each region can maximize its sales potential given finite capacity. We demonstrate that using the ensemble approach enables the focal company to improve its predictive validity over simple models by 11.09% and sales potential by 14.18%, with the same set of resources.

3 - Digitizing High-touch Interactions: The Divided Efficacy in Personal Selling

James Reeder, Purdue University - Krannert School of Management, West Lafayette, IN

, Mohammad Saifur Rahman
We study how digitization affects the efficacy of high-touch interactions, specifically by looking at the relative value of in-person versus virtual interactions (e.g., WebEx, Facetime). In a direct sales context, our empirical strategy exploits a pseudo-random experiment performed on 14,897 clients overseen by agents of a large medical device firm. A subset of agents switched from entirely using in-person visits (IPV) to a mix of remote visits (RV) and IPV. By studying the contemporaneous and spillover effects of RV and IPV, we find that, on average, IPV represents more than double the value of RV. However, in tech-savvy regions, the gap between the effectiveness of an IPV versus an RV reduces significantly. Further, smaller clients are less responsive to RV compared to larger clients, indicating a digital divide based on client size. Last, by studying the dynamic effects of RV and IPV, we find that a pulsing strategy drives the value of IPV even higher if used in conjunction with RV.

TD05

Virtual Room 05
Consumer Choice: Evidence from Experiments and Natural Experiments
Special Sessions
Chair: Georgios Zervas
Boston University School of Management, Brookline, MA
Co-Chair: Pinar Yildirim
University of Pennsylvania, Philadelphia, PA
Co-Chair: Yufeng Huang
University of Rochester, Rochester, NY, 14627-0001,
Co-Chair: Kosuke Uetake
Yale School of Management, New Haven, CT

1 - The Causal Effect of Recommender Systems vs. Best-Seller Lists: Evidence From an A/B Test

Shrabastee Banerjee, Tilburg University, Tilburg, Netherlands
George Knox

In a world of many alternatives, consumers turn to recommender systems (RS) to discover products that match well with their preferences and sellers devote substantial resources into developing them. Yet the causal effect of RS on demand and other outcomes of interest remain hard to study. In this project, we use data from an A/B test conducted by a large e-commerce firm in the Netherlands, which experimented with an item-to-item collaborative filtering

RS, relative to a control condition that used a bestseller list. We use the A/B test as an instrument to identify the effect of clicking on a recommendation on sales, as well as several intermediate steps in the customer journey: products viewed and put in basket. We see no overall effect of the RS on total revenue or purchases, but find a substitution effect: the fraction of purchases that directly result from a RS click or view is higher than that from a best-seller click or view. We also find that the RS drives consumers to view more products within a given session, but leads to less across-session diversity in viewed assortments. Taken together, our results have implications for the design and deployment of recommender systems on e-commerce websites.

2 - The Causal Effect of Attention and Recognition on the Nature of User-Generated Content: Experimental Results from an Image-Sharing Social Network

Justin T Huang, University of Michigan Ross School of Business, Ann Arbor, MI
Rupali Kaul, Sridhar Narayanan

Social networks rely on the sharing of content that is engaging to their users. Since continued generation of user-generated content is critical to their success, they have created a variety of tools motivate their creators to create and share new content, to facilitate discovery of new content by their users, and to provide attention and recognition to the best content shared by their creators. Such attention and recognition have been shown in past research to increase the volume of content shared on the networks. But how do these affect the nature of content created and shared on their platforms? Do they cause creators to share content similar to the ones that received attention and recognition? Or do creators take risks and create content different from the ones that received attention and recognition? These are the questions we ask in this paper. Our empirical context is an image-sharing social network, where creators share various types of digital art and photographs. We leverage exogenous variation in attention and recognition given to specific pieces of a content, induced through a randomized controlled experiment. We employ a machine learning algorithm to convert images into a set of lower-level features, using a transfer learning approach to train this algorithm. Our main findings are that creators create content different from the ones that received attention and recognition, and that this is robust to a variety of ways in which we classify image content. Our results illustrate the importance of tools meant to create attention and recognition to the creation and sharing of diverse content by the creators on social networks.

3 - Identifying State Dependence in Brand Choice: Evidence from Hurricanes

Julia Levine, UCLA Anderson School of Management, Los Angeles, CA
Stephan Seiler

We analyze structural state dependence in brand choice using variation from brand switching during stock-outs caused by hurricanes. We derive a simple test for structural state dependence based on the time-series of choice persistence for households affected by the stock-outs that requires fewer assumptions than most previous work. Using data from the bottled water category, we show that demand increases substantially around hurricane events and causes households to purchase different brands. We find that purchase behavior reverts back to its pre-hurricane trajectory immediately after the hurricane and we are not able to reject the null hypothesis of no structural state dependence. We show that our results are not driven by unusual purchases during the hurricane or context-specific purchase behavior.

4 - Addiction and Alcohol Tax: Evidence from Japanese Beer Industry

Kosuke Uetake, Yale School of Management, New Haven, CT
Masakazu Ishihara, Makoto Mizuno, Kohei Hayashida

We study the effects of taxation and regulation on addictive alcohol consumption. Exploiting the changes in tax policies and sales regulation in the Japanese beer market, we examine how consumers react to the policy changes by adjusting their alcohol consumption and by substituting to different categories with different alcohol content. We first show some descriptive evidence that consumers (i) are addictive to alcohol, (ii) are responsive to tax policies and regulation, and (iii) substitute to cheaper categories in response to policy changes. These findings lead us to estimate a dynamic structural model of alcohol purchase and consumption where consumers choose both categories and amount. Also, multiple policy changes allow us to identify the consumer's time-inconsistent preference in addition to preference for addiction to alcohol. Using the estimated model, we examine alternative alcohol policy designs.

TD06

Virtual Room 06
Big Data, Machine Learning, and Causal Inference
Contributed Sessions
Chair: Daniel Chen
The Wharton School, Philadelphia, PA

1 - Machine Learning and Prediction Errors in Causal Inference

Daniel Chen, The Wharton School, Philadelphia, PA
Gad Allon, Zhenling Jiang, Dennis Zhang

Machine learning is a growing method for causal inference. In machine learning settings, prediction errors are a commonly overlooked problem that can bias results and lead to arbitrarily incorrect parameter estimates. We consider a two-stage model where (1) machine learning is used to predict variables of interest, and (2) these predictions are used in a regression model for causal inference. Even when the model specification is otherwise correct, traditional metrics such as p-values and first-stage model accuracy are not good signals of correct second-stage estimates when prediction error exists. We show that these problems are substantial and persist across simulations and an empirical dataset. We propose general sample-based methods to identify when prediction errors are significantly biasing estimates and provide consistent corrections for the case where unbiased training data is available for the machine learning dataset.

2 - The Role of Live in Livestreaming Markets: Evidence using Orthogonal Random Forest

Ziwei Cong, Hong Kong University of Science and Technology, Hong Kong, China
Jia Liu, Puneet Manchanda

A common belief about the growing medium of livestreaming is that its value lies in its live component. We study this belief by comparing how price elasticity of demand for live events varies before, on the day of, and after livestream. We take advantages of our unique access to rich datasets from a large livestreaming platform that allows consumers purchase the recorded version of livestream after the stream is over. Due to the presence of high-dimensional confounders whose relationships with treatment policy (i.e., price) and outcome of interests (i.e., demand) are complex and partially known in a panel data setting, we adopt a generalized Orthogonal Random Forest framework for heterogeneous treatment effect estimation. We find significant temporal dynamics in price elasticity of demand over the entire event life-cycle. Specifically, demand becomes less price sensitive over time to livestreaming day and is inelastic on that day. Over the post-livestream period, demand for recorded version is still sensitive to price, but is much less than pre-livestream period. We further provide evidence for the mechanisms driving our research findings: consumers value the opportunity of real-time interaction with content creators, and also consumers face with different levels of quality concerns over event life-cycle.

TD07

Virtual Room 07
Causal Machine Learning
Contributed Sessions
Chair: Tawei Huang
PhD Student, Harvard Business School, Boston, MA

1 - Empirical Analysis on Household Food Carbon Footprint using Homescan Data

Lu Yan, Purdue University, West Lafayette, IN
Ting Zhu, Li Song

Global warming can be overwhelming, and shopping choices in day-to-day life can intensify or lessen the household's impact on the environment. What to eat and where to purchase food influence the household food carbon footprint together. We examine whether and why shopping at the warehouse club stores affects household food carbon footprint. Using the process-based Life Cycle Assessment (LCA) model and Nielsen Consumer Panel data, we calculate the household food carbon footprint and measure the effect from shopping at the club stores on household carbon life. To address the self-selection concern into the club store shopping treatment, we implement a robust latent-factor approach, generalized synthetic control (GSC), to synthetically impute counterfactuals for treated units. Generalized synthetic control (GSC) unifies the synthetic control and interactive fixed effects model that incorporates unit-specific intercepts interacted with time-varying coefficients. We find that the average treatment effect on the treated units is significantly positive: household per capita produces 6.65% more on food carbon emissions each quarter after starting to shop at the club stores. Next, we will investigate why shopping at the club stores increases the household food carbon footprint. If the specific characteristics of the club stores, like lower prices, larger package sizes, and different assortment, are main drivers for the club store carbon effect? Further, we will explore whether the club store carbon effect is heterogeneous across different households.

2 - Extending Double Machine Learning: Graphical Causal Models in Marketing

Sriniketh Vijayaraghavan, PhD Candidate, Wisconsin School of Business, Madison, WI
Neeraj Arora

Double Machine Learning (DML) has shown that we can get causal effects from observational data using plug-in machine learning methods. While this provides a significant leap in causal estimation, DML is valid only when we have conditional ignorability (or unconfoundedness). DML fails if there are any hidden confounds in the data generating process; this drawback of DML prevents its widespread application in empirical research. In this paper, we develop a novel machine

learning estimator that can recover causal effects consistently in the presence of hidden confounds. We do this by using Graphical Causal Models (GCM)—where we describe our data generating process as a directed acyclic graph—to identify the causal effects. Nonparametric identification of causal effects is much easier, and more scalable, using GCM than the potential outcomes framework. We use the efficient influence function for these identified causal effects to construct a machine learning estimator and call this estimator, 'GraphDML'. Most marketing problems deal with endogeneity arising from unobserved confounds that bias the causal effects. Our method can incorporate these unobserved confounds into the data generating process and still recover consistent estimates. We then apply GraphDML to estimate the causal effect of email campaigns on conversions in a B2B setting that contains several hidden interactions that are unobserved to the researcher.

3 - Less is More: When Short-term Signals are More Valuable than Long-term Outcomes in Targeting

Tawei Huang, PhD Student, Harvard Business School, Boston, MA
, Eva Ascarza

Firms target customers with the best response toward a marketing action to maximize its effectiveness or ROI. Doing so requires firms to identify differences in customer sensitivity, estimates that they often obtain using uplift / heterogeneous response models. While those methods have been proven effective in several marketing contexts, little is known about their performance when firms estimate the sensitivity of a long-term outcome. In theory, the observation window should not alter the way firms optimize their resource allocation - i.e., to maximize customer values in the long run, they should target based on long-term treatment effects. However, long-term measures accumulate random behaviors over time. These noises can cause systematic bias even when common causal assumptions hold.

We show two distinct estimation biases arise when estimating long-term treatment effects on repeated purchase measures. First, uplift models often misattribute random purchase behaviors to the intervention and observed covariates, leading to the collider bias for customers with unexpectedly high (or low) purchase counts. Besides, typical outcome regressions without considering latent customer churn are more prone to overfit random noises in churn and purchase processes. The prediction errors of outcome models can cause systematic bias for AIPW or doubly robust estimators. As a result, targeting customers based on predicted long-term lifts results in suboptimal policies.Building upon literature in statistical surrogacy and buy-till-you-die models,

we propose an imputation approach that overcomes these biases and enables firms to improve targeting performance in the long run. Our solution only uses short-term signals with less noise, captures the carry-over effect of short-term behavior change, and overcomes the overfitting problem by separating the churn and purchase processes. Using simulation and a real-world coupon experiment, we show that our approach can significantly reduce the estimation bias and improve the long-run targeting profit by ~20%.

TD08

Virtual Room 08
Brand Extensions and Risk Management
Contributed Sessions
Chair: Paul R Messinger
University of Alberta, Edmonton, AB, Canada

1 - Brand Extension Fit and Tourist Inspiration: The Moderation Effects of Brand Familiarity and Implicit Beliefs

Tsunwai Wesley Yuen, Assistant Professor of Marketing, Royal Holloway, University of London, London, United Kingdom
Yu-Lun Liu

Brand extension (BE) refers to the use of an established brand name to introduce products to a new product category. This strategy has been employed by multinational brands to attract tourists when they travel to an unfamiliar destination. The existing literature predominantly indicates that a higher taxonomic and thematic fit between the parent brand's and BE's product category can affect the BE success. Taxonomic fit refers to the BE being introduced within the same membership of a common product category whereas thematic fit is about the BE providing different functional usage in the same consumption scenario. However, a high fit BE does not guarantee success in the tourism industry. For example, EasyJet has withdrawn its EasyCar extension, a car rental service, albeit having a high taxonomic fit. This may be due to the BE being unable to create the inspiration feeling that tourists seek during their travel. Adopting the dual-processing and consumer inspiration models, the current research investigates how a taxonomic fit and thematic fit affect tourist inspiration and subsequently their BE adoption intention. A scenario-based experiment (457 US participants) revealed that tourists' adoption of a BE product is determined by discovering their inspired feelings about the level of BE fit (high/low Taxonomic*Thematic). The combination of a low taxonomic and high thematic fit BE can elicit the highest tourist inspiration, which leads to the BE adoption

intention. Such an effect can be positively moderated by a high familiarity with the parent brand. Moreover, the implicit belief, particularly entity (rather than incremental) belief, can positively strengthen the effect further. The findings advance the literature by uncovering the new role of tourist inspiration on BE in tourism marketing.

2 - Managing and Mitigating Sociopolitical Firm Risk Events

Chen Jing, Doctoral Candidate, Boston University, Boston, MA
, Dokyun Lee Jx Shuba Srinivasan, Susan Fournier

Firms are increasingly concerned with mitigating the negative effects of risk events, with a focus on maximizing positive outcomes for profits, firm stakeholder relationships, and firm value. Risk management becomes especially salient when the company's brand connects to trending sociopolitical issues through campaigns intended to garner cultural resonance or through unanticipated consumer activism. Firms with the best intentions can clash with social norms and expectations, resulting in harmful risk outcomes. This research provides marketers with a deeper understanding of the impact of sociopolitical firm risk events and offers guidance regarding strategies to mitigate their negative consequences. First, the authors build machine learning models by leveraging the Natural Language Processing (NLP) method BERT to label and extract public opinion for sociopolitical firm risk events. Then, the authors use synthetic control method to examine the impact of sociopolitical firm risk events and different company mitigating strategies on three outcomes: (1) sentiment of public opinion relating to sociopolitical firm risk events; (2) sentiment of public opinion for the focal firm; and (3) firm value, as measured by stock performance.

3 - Dimensions of Brand-extension Fit

Paul R Messinger, University of Alberta, Edmonton, AB, Canada
Qian (Claire) Deng

A sizable research stream in marketing finds that a strong fit between a brand extension product and its parent brand encourages positive consumer responses. Yet this large body of literature fails to provide managers with specific practical guidance about how to create brand-extension fit for optimal results. The problem is a lack of understanding of what brand-extension fit really is, and there has been little work to address this issue by synthesizing the key dimensions of brand-extension fit. The current article addresses this gap by identifying the key constituent dimensions of brand-extension fit. This is an important topic because brand extensions are essential for business renewal and growth.

We identify six dimensions of brand-extension fit: feature-based, function-based, resource-based, usage-occasion-based, market-based, and image-based fit. Each dimension addresses a different aspect of brand-extension fit and suggests ways for brand managers to create brand-extension fit. Less expected is that studies that use a strict subset of these dimensions overweight those fit dimensions that are included, and the associated estimated coefficients are biased. From a managerial perspective, counterfactual analysis also shows that reliance on a strict subset of these dimensions results in suboptimal decisions.

TD09

Virtual Room 09
Online Advertising
Contributed Sessions
Chair: Nils Wernerfelt
META, Menlo Park, CA

1 - Closing the TV Advertising Loop with Web Browsing Data

Leen De Schaepdrijver, Vlerick Business School, Ghent, Belgium
, Philippe Baecke, Koen Tackx

Lagging behind in measurement capabilities, TV is pushing data-focused marketers away and into the arms of digital advertising giants such as Facebook and Google, that are often being favored due to direct accountability in terms of cost per click. This paper investigates whether web browsing data can be used to close the TV advertising loop, by linking household TV ad exposure to individual online response. Our study allows to move from an aggregated approach per (pre/post) time window, as is the current practice in literature, to an individual link between TV ad exposure and online response. We created a unique dataset by merging 3 months of household level TV viewing data from 1885 customers of a European telecommunications company with measures on advertisement content and web browsing data on an individual level. The dataset spans over 300 TV commercials by 118 brands. By using a matching approach, we are able to compare the browsing behavior of people that were exposed to an advertisement to that of people who were not. We use a generalized linear mixed model to investigate TV advertising effectiveness. The initial findings indicate that television advertising does influence online visits and that this effect diminishes over time. Moreover, TV advertising seems to have a stronger effect on web visits during daytime, while advertising during the weekend has a negative effect. TV advertising content seems to play an important role,

with action-focused content having a positive effect on web visits and information-focused content having a negative effect. The preliminary results suggest that advertising copy and media placement characteristics such as time of advertising affect online response, making them especially relevant for campaigns that focus on the consideration and conversion stage.

2 - Top Performing Brands in Grocery Used Full-funnel Advertising in 2020

Kapil Goya, Amazon, New York, NY
Luba Smolensky, Cameron Smith

Since the first quarter of 2020, advertisers have experienced important changes in demand for their products. Inmar polled over 300 US grocery consumers and found that 78.7% of them purchased groceries online and 51.4% reported buying groceries from Amazon, an increase of +32% vs. the previous year. Grocery advertisers wish to understand the impact of changes in the behavior of grocery shoppers on sales. They also seek to understand how top performing grocery brands have adjusted their advertising plans to respond to these market changes. They want to know this to improve their advertising decision making and achieve superior performance. This analysis compares actual sales in 2020 to sales predicted by using an econometric model. It also examines the relationship between advertising investment and sales performance and identifies the changes in advertising investments made by top vs. bottom performing grocery brands. Results show that top performing brands in the grocery category invested more than bottom performing brands overall,and increased their investment in Amazon full-funnel advertising. Based on these results, we recommend that advertisers consider using Amazon full-funnel advertising, and, especially, consider increasing upper funnel investment to help shoppers find their brands.

3 - Subscription Revenue and Media Content: Evidence rom Youtube

Heyu Xiong, Weatherhead School of Management, Case Western Reserve University, Cleveland, OH
Aniket Panjwani

A striking trend in the media industry in recent years has been the rise and re-emergence of subscription-based revenue models. Our paper addresses two main questions. First, which creators select into subscription-based business models? Second, what is the causal effect of increased subscription dependence on media content? To answer both questions, we exploit institutional features of YouTube in conjunction with a natural experiment on Patreon, a platform which allows YouTubers to solicit recurring payments directly from their viewers. First, we show that more successful Youtubers were more likely to become early adopters of Patreon. Second to identify the causal effect of subscription revenue, we utilize the 2015 cyberattack on Patreon as an exogenous shock that drove donors away from the platform and decreased subscription revenue to Youtubers on the platform. We find that this reduction in subscription-earnings leads to a significant increase in the quantity of advertising embedded in media content. While this "see-saw" relationship between subscription and advertising revenue is not surprising, we further show that Youtubers are very strategic in how they include advertising. Specifically, the increase in advertising was concentrated in types of advertising that is not easily discernible by their viewers. In contrast, there was no change in less covert forms of advertising on the platform. Altogether, our results suggest that media creators strategically utilize native-advertising to lessen the nuisance cost of advertising and avoid full losses in perceived programming quality.

4 - Estimating the Value of Third Party Data to Advertisers

Nils Wernerfelt, Meta, Menlo Park, CA

A central debate in digital marketing today focuses on the role of third-party data in advertising. Privacy advocates tend to push for greater restriction around such data usage to support consumer protection. At the same time, advertisers view the marginal benefit of this data as extremely high for optimizing and targeting ad delivery. While comparatively more work has been done on the former, there is relatively scant evidence on the latter, a key input to designing optimal policy.

The goal of this paper is to shed light on this question via a large-scale experiment with over one million advertisers on Facebook. The experiment utilizes a 3x2 design. First, we take live campaigns that use third-party data and randomly assign a small portion of users to a control group that is not eligible to be exposed to the relevant ads. This lift measurement component allows us to estimate the incremental impact on purchases and new customers of current business-as-usual advertising that utilizes third-party data.Second, we modify an additional small fraction of traffic to reflect two main ways that delivery may be affected by a loss of third-party data: (i) via loss of inputs for optimization algorithms and (ii) via limiting the ability to form look-a-like audiences for targeting purposes. As with the business-as-usual advertising, we use control groups to measure the incremental impact of these two alternative forms of ad delivery. Comparing across the arms allows us to derive a first-order estimate of the change in incremental impact of advertising under a loss of third-party data for a large, representative population of advertisers. We discuss both main effects and heterogeneity, as well as possible policy implications.

TD10

Virtual Room 10
Financial Regulation and Taxation
Contributed Sessions
Chair: Scott Shriver
Leeds School of Business, Boulder, CO

1 - Consequences of Taxing the Online Advertising Industry

Lennart Kraft, Goethe University, Frankfurt, German
Regulations such as privacy laws increasing consumer privacy have pressured targeted advertising. Recently, regulators worldwide have been intensifying taxation of the online advertising industry, further increasing this pressure. However, the consequences of such taxes remain largely unknown. This study aims to provide insights into these consequences by examining how different data taxes impact publisher and advertiser profits of targeting, regulator's tax revenue, deadweight loss, and consumer privacy. The empirical study builds upon 999 ad campaigns covering 6,761,507 ad impressions and finds that an advertiser-paid data tax outperforms a publisher-paid data tax in five out of six relevant trade-offs. More specifically, it creates higher tax revenue and higher or equal consumer privacy for the same decrease in publisher and advertiser profits and the same deadweight loss. Yet, recent intensifications of taxing the online advertising industry build mainly upon taxes resembling publisher-paid data taxes. Hence, the study suggests that regulators could improve the taxes' impact if they implement advertiser-paid data taxes instead. For example, a publisher-paid data tax of 3% on targeted advertising revenue yields a 2.5 times higher deadweight loss than an advertiser-paid data tax. The study concludes with implications of data taxes for publishers, advertisers, consumers, and regulators.

2 - How Does a Standard to Implement Privacy Regulations Affect Tracked Web Traffic? Evidence from IAB's Transparency and Consent Framework

Yuxi Jin, Goethe University Frankfurt, Frankfurt, Germany
Bernd Skiera
Under the General Data Protection Regulation (GDPR), firms in the online advertising industry need to get tracked web traffic while fulfilling the legal obligations. Nevertheless, flexible requirements and heterogeneous interpretations make regulatory compliance difficult and costly. Many firms have participated in IAB's Transparency and Consent Framework (TCF), the most prominent industry standard to help implement privacy regulations. Yet, it is unclear how TCF participation affects the tracked web traffic of ad-tech vendors and publishers (websites) in terms of quantity and quality. The analysis of panel data covering 30 months with 1,242 vendors and 6,758 publishers yields that the TCF participation decreases tracked web traffic for vendors by 8.42% (page loads) but not for publishers. Such decrease, if any, reflects that fewer data are collected from users, evidence of enhanced privacy protection. Compared to publishers, the relative negative impact on vendors is likely explained by their passive role in getting user consent. We identify that vendors face a quantity-quality trade-off when deciding on TCF participation while publishers do not. Specifically, vendors receive the same number of requests per page load as before, but the share of requests with tracking increases by 40.78%, incurring an overall rise of 28.92% tracked requests that gain vendors higher profit than the non-tracked ones. Publishers get fewer requests (10.86%) with a stable share of tracked requests. Moreover, the TCF changes the bipartite network of vendors and publishers, which explains the heterogeneous outcomes. Conducting an event study, we find that TCF vendors are more likely to work with safer publishers that receive requests less likely to be blocked by browser extensions over time. Our findings are generalizable to the increasing number of privacy laws worldwide. The results also recognize the efficiency brought by a standard when implementing cross-regional policies with flexible requirements.

3 - Privacy and Market Concentration: Intended and Unintended Consequences of the GDPR

Scott Shriver, Leeds School of Business, Boulder, CO
We show that websites' vendor use falls after the European Union's General Data Protection Regulation (GDPR), but that market concentration also increases among technology vendors that provide support services to websites. We collect panel data on the web technology vendors selected by more than 27,000 top websites internationally. The week after the GDPR's enforcement, website use of web technology vendors falls by 15% for EU residents. Websites are more likely to drop smaller vendors, which increases the relative concentration of the vendor market by 17%. Increased concentration predominantly arises among vendors that use personal data such as cookies, and from the increased relative shares of Facebook and Google-owned vendors, but not from website consent requests. Though the aggregate changes in vendor use and vendor concentration dissipate by the end of 2018, we find that the GDPR impact persists in the advertising vendor category most scrutinized by regulators. Our findings shed light on potential explanations for the sudden drop and subsequent rebound in vendor usage.

TD11

Virtual Room 11
COVID-19 Impact on Health and Education
Contributed Sessions
Chair: Angela Yi
Virginia Tech, Blacksburg, VA

1 - School Closures on Customer Acquisition in E-learning

Karthik Kannan, Assistant Professor, Southern Methodist University, Dallas, TX
Wayne Taylor

We explore the how COVID-19 related public school closures and subsequent online learning usage, influenced adoption of complementary online learning resources. Using data from a national firm specializing in test preparation for gifted students, we seek to understand whether COVID-19 affected usage and more importantly how this change varied by socioeconomic factors, inferred by customer zip code. This has important implications for both marketers and at the policy level. Marketers from e-learning firms may be interested in understanding the extent to which COVID-19 and its impact on in-person public schooling cannibalized or inspired usage in other e-learning resources, both in terms of baseline adoption and revenue generation. At a broader policy level, we hope this research sheds light as to whether obtaining comfort with online learning tools has been a barrier to accessing other, potentially helpful, online learning resources for a variety of socioeconomic groups.

2 - Heterogeneity in Patient Adoption and Usage of Telehealth During the COVID-19 Pandemic

Weijia (Daisy) Dai, Purdue University, West Lafayette, IN
Siyun Lv, Qiang Liu, Yong Cai

Telehealth visits increased rapidly at the start of the COVID-19 outbreak as healthcare providers across the US rushed to enable telehealth services to limit virus exposure. Telehealth played a critical role in the continuation of care for the most vulnerable patients during the COVID-19 pandemic. However, the adoption of telehealth in preventing care disruption varied widely across different providers and demographic groups. Furthermore, telehealth utilization dropped sharply when pandemic pressure eased despite its wide accessibility spurred by hospital adoptions. In this paper, we estimate how the hospital adoption of telehealth affects patient utilization over time and how the effect is moderated by pandemic severity, lock-down policies, patient demographics, and hospital attributes. We use IQVIA Medical Claims (Dx) data built on a panel of patients. Our data consists of 75 million in-person and online medical visits treating breast cancer

and schizophrenia between January 2018 and October 2021 at the largest 10,000 health care organizations. By assessing the heterogeneous take-up and usage of telehealth among patients, we derive insights into the most valuable areas of telehealth applications.

3 - COVID-19 Morbidity Information Disclosure Format and Levels: Impact on Compliance with Recommended Preventive Behaviors

Angela Yi, Virginia Tech, Blacksburg, VA
Dipankar Chakravarti

Coverage of the COVID-19 pandemic has varied by media outlets. Some outlets presented infection and morbidity information both as frequencies and percentages, whereas others reported only the frequency information. Moreover, information disclosure level also varied: some outlets selectively reported only the infections and deaths data, whereas others have provided breakdowns of the infections data by severity (recoveries) and deaths. These seemingly innocuous differences in morbidity information disclosure formats and levels may have had different effects on people's judgments of the pandemic's severity and their health concerns (for themselves and family members). This in turn may have affected their compliance intentions with recommended preventive behaviors (RPBs). We also examine whether these effects are moderated by individuals' socio-economic ideology (i.e., self-perceptions as liberal/conservative on social vs. fiscal dimensions). A web experiment examined these issues using a 2 (format: frequency; frequency and percentage) x 3 (level: tested positive, deaths; tested positive, deaths, recoveries, still sick cases; tested positive, deaths, recoveries, still sick cases, infection severity) design. Participants (327 MTurk workers) rated their compliance likelihood with four RPBs (social distancing, mask wearing, self-quarantine and lockdown). We also measured participants' social-fiscal ideology, and the extent to which their compliance motivation was to protect themselves versus others. Results show that information format presenting frequencies and percentages (vs. frequency alone), lowered health concern judgments. Lower health concerns mediated lower compliance with the RPBs. Self-reported social-fiscal ideology moderated the effect for some RPBs.

TD12

Virtual Room 12
Consumer Behavior: Experimental Methods
Contributed Sessions
Chair: Akshina Banerjee

University of Chicago, Chicago, IL

1 - The Semblance of Success in Nudging Consumers to Pay Down Credit Card Debt

Benedict Guttman-Kenney, PhD Economics Candidate, University of Chicago, Chicago, IL
Paul Adams, Stefan Hunt, David Laibson, Neil Stewart

We study how consumer responses to a nudge counteract its intended effect to reduce credit card debt. The nudge shrouds the option to automatically pay only the minimum due - automatic minimum payment - and increases the salience of an alternative option - automatic fixed payment - to automatically amortize debt faster. Despite the intervention causing large proximate effects - increasing enrollment to this salient payment option 21 percentage points and reducing the likelihood of paying exactly the minimum by 7 percentage points - it has no distal effects on debt. Results are explained by three offsetting consumer responses: (i) Automatic fixed payment amounts selected often bind at or just above the minimum due; (ii) Automatic payment (autopay) enrollment decreases - increasing missed payments; and (iii) Non-automatic (manual) payments decrease. For a selected subsample, we link liquid savings data to construct a new measure of liquidity constraints - the minimum liquid cash balance over 90 days - and find (i) bunching of minimum liquid balances just above zero (ii) credit card debt repayment is discontinuously lower when minimum liquid balances fall below zero.

2 - Understanding Why Customers Co-hold Savings and Debt: A Field Experiment

Rafael M. Batista, University of Chicago Booth School of Business, Chicago, IL
Neale Mahoney, Jessica Min, Abigail Sussman

This project explores co-holding, whereby consumers consistently carry low-yielding savings balances while also holding onto high-interest debt. Through a large-scaled randomized controlled trial (RCT) we sought to test two hypotheses. The first was that consumers were unaware that they were co-holding. Consumers have limited attention and therefore may have overlooked the amount they had available in savings when looking at their credit card balances and deciding what to pay off. The second hypothesis was that even if they were aware that they were jointly holding onto savings and debt, they may not have realized the costs of doing so. 125,328 co-holding customers from a large financial institution were randomly assigned to one of three conditions: one which informed consumers that they were co-holding, another that informed but also made the costs of doing so salient, and a third, control group which received no new information. We find no meaningful difference between the two treatment groups. We also find no noticeable difference in the amount repaid between those receiving a notification and those in the control group (p = .162). However, those in the treatment conditions paid more post-intervention than they had pre-intervention (p < .001) and were also more likely to pay more than the minimum contracted amount (p < .001). Our results suggest that consumers might be co-holding for reasons which are not a lack of awareness or a misunderstanding of the costs. Since conducting this study, we have surveyed a subset of these same consumers and are currently in the process of linking responses to their banking data in order to conduct further analyses.

3 - The Impact of Uncertainty on Customer Satisfaction: Evidence from Amazon Reviews

Camila Back, LMU Munich, Munich, Germany
Martin Spann

Customer satisfaction is an important metric to predict customer behavior and as a result firms' profitability. Expectations of a product's performance serve as a reference point against which customers evaluate their satisfaction with the products' actual performance. But reference points are usually conceptualized as single point estimates. So what effect does uncertainty in expectations have? The current paper offers a theoretical model of satisfaction, in which expectations reflect distributions of individual beliefs about performance outcomes. This approach allows us to capture potential effects from comparing actual performance levels to (multiple) levels that could have been. Based on this model, uncertainty shifts subjective reference points upward. That is, uncertainty increases the performance level at which customers shift from being dissatisfied to being satisfied. Furthermore, uncertainty has an attenuating effect on both positive and negative deviations of actual performance from subjective reference points. Put differently, a bad performance feels less bad and a good performance feels less good when it is expected, compared with unexpected. We find support for our model's predictions by analyzing product review data from Amazon, where we operationalize satisfaction based on individual customers' ratings and infer actual product performance from objective quality ratings. An experiment under controlled conditions further corroborates our findings. These results have implications for the communication of uncertainty (e.g., when to communicate broad or wide ranges of expected performance) and shed light on firms' abilities to extract value from inferred uncertainty levels by customizing customer valuation and recovery strategies.

4 - The Language that Drives Engagement: A Systematic Large-scale Analysis of Headline Experiments

Akshina Banerjee, Booth School of Business, University of Chicago, Chicago, IL

What motivates people to consume information? A broad range of theories in social and cognitive psychology have identified relevant characteristics, including, linguistic structure, fluency, affect, construal, personalization and many other factors. We take an ecologically valid and general approach to identifying causal effects of language on engagement decisions, using a large-scale database of field experiments conducted on Upworthy.com. Online journalism increasingly relies on catchy click-bait language in headlines to optimize engagement (Frampton 2015). We investigate what makes messages effective at driving engagement, using NLP tools to bridge the gap between the numerous specific but atheoretical results from a database of thousands of experiments conducted by Upworthy, and academic behavioral theories of how people generally interact with messages and textual cues. We extracted theoretically relevant measures from the content of the headlines themselves, using both existing tools (LIWC2015; Berger et al. 2020) and custom-defined scoring. Factor analyses were then used to extract underlying constructs from the measures. After testing for sufficient identifying variation across treatments, we identified 35 testable psychological constructs that mapped to informational, cognitive, linguistic and affective research, for 20 (57%) of which the literature provided directional predictions. Overall, after correcting for multiple comparisons, out of the constructs for which the literature provided predictions, the results were as predicted for about 20%, non-significant for 60% and the opposite of what had been predicted for 20% of constructs. Our findings provide a unique test of a wide range of persuasion-relevant theories, in an important real-world context, and illustrate how to use large-scale atheoretical experimentation to test theories of behavior.

TD13

Virtual Room 13
Social Media: Social Networks
Contributed Sessions
Chair: Begum Sener
Koc University, Istanbul, Turkey

1 - Negative Imagery Framing for Advertising Climate Change on Social Media

Shuge Li, University of New South Wales, Sydney, Australia
Jun Bum Kwon, Huy Pham Quang, Felix Septianto, Pradeep Chintagunta

While climate change is a significant problem in the world, communicating climate change issues has been challenging because the nature of the issue is abstract, complex, and slow-moving, thus hindering environmental nonprofit organizations (NPO) from engaging their audience. The current research examines how negative imagery framing in NPO advertising increases viewer engagement on social media. By detecting visual theme about climate change issues and classifying it into negative and positive framing in each 1,537 Greenpeace Australia Pacific Instagram posts, this research shows that negative framing increases social media engagement (i.e., the number of likes and comments). A follow-up experiment also suggests that present focus drives the framing effect. Moreover, this research also shows that warmer, more saturated, and brighter colors enhance the aforementioned effect. As such, findings of the present research contribute to the literature on climate change communication, emotional content on social media, and color psychology, and further provide concrete and feasible implications for NPO to promote societal issues such as climate change. Keyword: Climate Change, Visual Analytics, Negative Imagery Framing, Color,

2 - The Power of Humor in Marketer-generated Content on Social Media

Zhiqiang Li, Zhongnan University of Economics and Law, Wuhan, China
Yaxuan Ran

Against the backdrop of the prevalence of social media, brands are increasingly relying on it as a channel for marketing communication. Brands frequently express themselves or promote their products by posting texts and images online, defined as marketer-generated content (MGC), that contain humor to drive customer engagement. Despite an extensive literature on how humor feature impacts firm-customer interactions, far less is known about its divergent effects on customer behaviors. This research classifies humorous MGC into two types: warmth-oriented humor contents (WHC) and competence-oriented humor contents (CHC). We draw on benign violation theory and stereotype content model to capture two distinct mechanisms of the differential effects. Based on an unstructured field data of MGC from Facebook, the current research used natural language processing and machine learning techniques to construct metrics of the two kinds of humor contents. Results reveal that WHC receives more customers' positive attitude (i.e., likes and shares), whereas CHC leads to higher customers' purchase intention inferred from the comments. A field study on a real social media platform in China (i.e., Weibo) provide further evidence to demonstrate causal relationships of the main effect. Two experiments further suggest that perceived closeness drives the effect of WHC

on customers' positive attitude, while perceived persuasion is the key force that explain the effect of CHC on purchase intention. Collectively, these results highlight the mixed roles of humor use in MGC and facilitate existing knowledge of relationships between customers' positive attitude and purchase intentions in social media. Although the attribute of humor has a positive impact, content engineering on humor styles would drive consumers' path to conversion (virality to purchase). Separately, the methodology we apply helps extract marketing-relevant insights in unstructured data on social media.

3 - The Impact of Personality on Social Media Engagement: The Case of Snapchat

Sumiran Satyal, Southern Illinois University, Edwardsville, IL

Edmund Hershberger, Michael Hair

This paper attempts to understand the relationship between various personality traits and Snapchat use. A survey was conducted among 265 undergraduate students. Measured variables included the so-called Five Factor Model (McRae and John 1992), which includes Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. These were measured using the Ten Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003) We also measures Narcisim using the 16 point Narcissistic Personality Inventory (NPI) (Ames, Rose, & Anderson, 2006). Dependent variables included measures of respondents' likelihood to engage in various social media related behaviors. We found that Extraversion, and Narcissism were positively related to engagement behaviors, while Conscientiousness and Openness to Experience were negatively related to engagement behaviors. Respondents who were high on Extraversion displayed the greater use of Snapchat and its features. Respondents who were high on Narcissism were more likely to expand their Snapchat use and interact with people other than their friends. Respondents high on Conscientiousness limited themselves to communicating with friends and peers. Respondents who were high on Openness to Experience had lower levels of engagement overall.

4 - Brand Generated Emotional Content in Social Networks

Begum Sener, Koc University, Istanbul, Turkey

Berk Ataman, Ezgi Akpinar

With the ever-increasing competition for attention in social media, generating engagement with branded content posts has become harder. A large body of research exploring how to effectively communicate with the consumers through social media channels has highlighted the importance of emotional content and offered insights as to which emotions generate greater engagement and why. Yet, surprisingly few studies have investigated the effect of the emotional state of the consumers. Provided that social media content is not consumed in a vacuum, the current paper examines consumers' reactions to brand-generated emotion-laden social media content conditional on their emotional states. To that end, the authors combine three sources of data comprising a large sample of user-generated social media posts, brand-generated social media posts from 359 FMCG companies, and a field study to represent emotions as their corresponding underlying dimensions. The results show that (1) the arousal level of consumers' emotional state drives engagement even in the absence of emotions in brand-generated content and (2) the ability of an emotion in brand-generated content to increase engagement depends heavily on where it stands in relation to the consumers' emotional states on all underlying dimensions of valence, arousal, and dominance. This study highlights the importance of contextual elements in consumer engagement and offers managerial insights on how to create effective social media campaigns. Keywords: social media; brand generated content; emotions; engagement

TD14

Virtual Room 14

Opportunities and Challenges for using Video Data in Marketing Research

Special Sessions

Chair: Ishita Sunity Chakraborty

University of Wisconsin, Madison, WI

1 - Finding the Sweet Spot: Ad Targeting on Streaming Media

Prashant Rajaram, Western University, London, ON, Canada

Puneet Manchanda, Eric Schwartz

A majority of US households view on-demand content on streaming video services. Not surprisingly, ad spending on these online services is growing rapidly. However, extant research on streaming media has not explored the balance between the interest of the viewer (content consumption) with that of the platform (ad exposure). We do this using two new metrics that capture the interplay between content consumption and ad exposure using viewing data on a streaming media platform. The first metric (Bingeability) measures non-linear content consumption while the second metric (Ad Tolerance) measures the willingness of a viewer to continue viewing after ad exposure. Using causal machine

learning methods that comprise a tree-based model with instrumental variables, we capture the impact of ad delivery on Bingeability and Ad Tolerance for individual viewers for each viewing session. The results indicate that the sweet spot that balances the interest of the viewer and the platform consists of short (ad) pod durations that are equally spaced at long intervals during a viewing session. We discuss the implications of our results for managers of streaming platforms.

2 - Consumer Behaviour in the Online Classroom: Using Video Analytics and Machine Learning to Understand the Consumption of Video Courseware

Mi Zhou, UBC Sauder School of Business, Vancouver, BC, Canada

George Huaien Chen, Pedro M Ferreira, Michael D Smith

Video is one of the fastest growing online services offered to consumers. The rapid growth of online video consumption brings new opportunities for marketing executives and researchers to analyze consumer behavior. However, video also introduces new challenges. Specifically, analyzing unstructured video data presents formidable methodological challenges that limit the use of multimedia data to generate marketing insights. To address this challenge, the authors propose a novel video feature framework based on machine learning and computer vision techniques, which helps marketers predict and understand the consumption of online video from a content-based perspective. The authors apply this framework to two unique datasets: one provided by MasterClass, consisting of 771 online videos and more than 2.6 million viewing records from 225,580 consumers, and another from Crash Course, consisting of 1,127 videos focusing on more traditional education disciplines. The analyses show that the framework proposed in this article can be used to accurately predict both individual-level consumer behavior and aggregate video popularity in these two very different contexts. The authors discuss how their findings and methods can be used to advance management and marketing research with unstructured video data in other contexts such as video marketing and entertainment analytics.

3 - AI and AI-human Based Screening and Selection for Salesperson Hiring Using Interview Videos

Ishita Sunity Chakraborty, University of Wisconsin, Madison, WI

Khai Chiong, Howard Dover, K Sudhir

We consider the problem of AI and AI-human based screening (eliminating bottom candidates) and selection (hiring top candidates) in salesforce hiring. Using videos

of structured interviews of candidates and ratings from multiple recruiting experts on standard performance criteria, we develop an AI model of salesforce ``skill" prediction by extracting theory-relevant objective measures of interviewee performance embedded in videos. Using the model, we address two issues: First, to aid interpretability of the AI model, we assess what mode of unstructured data from the interview (text, audio and video information) and what specific behaviors (e.g, body language, conversation style) drive AI predictions of salesperson skill. We find that while initial screening decisions are heavily impacted by audio-visual features like ``energetic voice, final selection decision relies more heavily on linguistic features like being precise and quantitative. We also find that optimal amount of `interactivity in conversations" (i.e., frequency of turns in conversation between buyer and seller) and ``willingness to listen" (share of buyer speaking time) is an important determinant of high ratings. Second, we use a Bayesian approach to combine AI prediction with human judgment to assess improvements in predictive performance of the hybrid AI-human model with respect to a pure human panel benchmark. Augmenting AI with human judgment has limited benefit for screening but improves selection significantly. Further, human judgment based on the first 2-3 minutes of the interaction is sufficient. This suggests a cost-effective way to deploy AI in sales hiring---use AI exclusively for screening but augment it with human judgment based on early stages of interview for selection.

Friday, 9–10am

FA02

Virtual Room 02
Pricing I
Contributed Sessions
Chair: Chi Zhang
Texas A&M University, College Station, TX

1 - Pricing and Advertising Decisions for New Prescription Drugs

Guneet Kaur Nagpal, Western University, London, ON, Canada

Rajdeep Grewal, Deepak Jena, Atul Nerkar

Taking the context of newly launched branded prescription drugs, we study the new product optimal advertising and pricing strategies in the presence of patents. One can argue that for prescription drugs protected by patents, which create competitive barriers, drugs may enter the market as monopoly offering and hence may have significant pricing power with reduced the reliance on advertising spends

as a differentiation or quality signaling tool. The empirical investigation of this argument remains elusive in the extant literature on new prescription drug launches. Consequently, we analytically develop and empirically estimate the simultaneous pricing and advertising spends equations using 328 newly launched branded prescription drugs introduced in the U.S. market during 1984-2003. We find that when drugs have longer time to exercise pricing power, firms tend to be relatively generous in bearing advertising costs; and when drugs have broader patent portfolio, firms tend to collect higher economic gains early on by charging higher prices. Further, advertising spends and prices are negatively associated, implying market penetration role of advertising spends at the time of drug launch. We also find that drug superiority factors relate positively to price and advertising spends, and that that firm's reliance on patents as pricing power tool and advertising spends reduces if the drug has higher efficacy and broader benefit scope respectively

2 - Managers' Salaries Effect on Customer Behavior

Oded Lowengart, Ben Gurion University, Beer Sheva, Israel
Gil Peleg

In the last decade, customers worldwide have expressed dissatisfaction with business activities' unfairness, especially from unequal wage distribution among employees (i.e., high CEO-to-regular workers' wage ratio). Research on the potential effect of such wages on customers' behavior indicates that presenting unequal wage distribution to customers at the time of purchase might hurt their tendency to purchase products and satisfaction. We propose that unfair wage distribution is salient in customers' decisions and manifested as a product/ service attribute through price fairness' perceptions. We decompose the wage distribution inequality by separating perceptions of managers' salaries from overall labor cost perceptions. We, therefore, diverge from the current literature by proposing an indirect effect of managers' salaries on customers' decisions in both preference and choice formation processes. Across different studies performed in different cultural environments, an adverse effect of managers' salaries on customers' decisions mediated by price fairness was found to be robust and generalized. Managerial implications are also discussed.

3 - NFT Digital Artwork Pricing using Image Analytics and Auction Models

Chi Zhang, Texas A&M University, College Station, TX
Venkatesh Shankar, Xiaohui Zhang

Non-fungible tokens (NFTs) are unique units of data stored on blockchains that can be used as public proof of ownership for various types of digital files. Online platforms, such as Foundation and SuperRare, have leveraged this property to track the copyright ownership of digital artworks and created corresponding online marketplaces. Digital artworks are traded as NFTs through auctions on these platforms. Compared with traditional offline art auctions, NFT online artwork auctions exhibit several different features. First, the reserve price of the object is open and ex-ante posted in contrast to the private and ex-post revealed reserve price in traditional art auctions. Second, the number of bidders is unknown during the bidding process in contrast to the informed number of bidders in the offline scenario. Third, transactions are settled with cryptocurrencies instead of government-issued fiat currencies like the U.S. dollar. Due to these differing features, the pricing of NFT digital artworks may differ from the pricing of traditional artworks. However, research on the valuation and pricing of NFT objects and NFT digital artworks is sparse. Existing studies focus on CryptoPunks and CryptoKitties, which are more homogenous collectibles than digital artworks. Furthermore, in practice, no clear guidelines exist for buyers and sellers on how to value NFT digital artworks and how to set the reserve prices for them. In this research, we address two key questions. What is the relationship between the content of digital artworks and their prices? What are the optimal reserve prices for different types of digital artworks? We address these questions by using computer vision methods and economic models of auctions on a dataset collected from a major NFT digital artwork platform. We investigate the relationship between the content of digital artworks and their prices, recover the bounds on the valuation distribution of the bidders and estimate the bounds for the optimal reserve price. The results from this study may provide a deeper understanding of the pricing of NFT objects and digital artworks.

FA03

Virtual Room 03
Influencer Marketing V
Special Sessions
Co-Chair: Verena Schoenmueller
Bocconi University, Milan, Italy
Chair: Andreas Lanz
HEC Paris, Paris, France

1 - Effectiveness of Influencer Marketing for Political Campaigns

Philip Kim, Indiana University, Bloomington, IN

Beth Fossen

Social media influencers have gained a significant foothold in digital marketing with their capacity to affect consumers. This influence has attracted the attention of political campaigns, which have begun utilizing partnerships with social media influencers with the hopes of impacting voter preferences. At a time when traditional digital ads for political campaigns are facing restrictions on many crucial platforms such as Google, Facebook, and Twitter, influencer marketing activity has emerged as an attractive digital advertising option for political candidates. These factors have led to a recent rapid growth of interest in and use of influencer marketing in political campaigns. Given the novelty and meteoric rise of influencer marketing in the political landscape, little is known whether and how much this marketing activity is effective in impacting voters in the political context. In this research, we investigate how sponsored influencer activities by political campaigns impact voter preference, measured through daily polls on political candidates. Furthermore, we examine which characteristics of influencer marketing activity are most crucial in affecting voter preferences and social media engagement. Our analyses utilize data of Twitter posts made by influencers and daily polls of voter preferences for the 2020 U.S. Democratic Party presidential primary candidates from July 1, 2019 to March 31, 2020.

2 - Ratioing and Credibility: The Effect of Like to Comment Ratio on the Perceived Credibility of Tweets

Behzad Rezaee, University of Lausanne, Lausanne, Switzerland

Tobias Schlager, Markus A Christen

AbstractWe are living at the apex of the communication era where people can easily share their news, experiences, and thoughts on social media which has created a lot of opportunities for us. However, wherever there is an opportunity, we will see opportunism as well. One of the current issues on social media is fake content and how to deal with them. In this article, we will show that cues such as the number of likes and comments of a tweet can play a significant role in its perceived credibility. More specifically and with analyzing both field and experimental data, we will demonstrate that the more like to comment ratio a post has, the more it is perceived as credible. We will also show that this perceived credibility comes from the channel of consensus cue which could be moderated by the susceptibility to the social influence of the user, their motivation, and their cognitive load. Moreover, as the boundary condition, we will show that only ratio matters for the perceived credibility and the order of magnitude of numbers don't play a role in our conceptual model.Keywords: Ratioing, Credibility, Twitter

3 - Sending the Wrong Message: Understanding Influencers Role in the Spread of Disinformation

Roman Welden, University of Tennessee, Knoxville, TN

Leah Smith, Kelly Hewett, Michael Haenlein

While influencer marketing provides many positives for society, its popularity has also given rise to the spread of disinformation. The growing role of influencers has led to an evolution of disinformation in terms of both reach and complexity. Nearly 40% of all social media users regularly share disinformation, triggering a need to understand how disinformation messages are structured and spread. Using affect as information theory, the authors propose that the structures surrounding an influencers social network (e.g., micro vs macro influencer, connections with other influencers) interacts with message elements (emotional valence, cognitive activation, and credibility) to impact the ways in which individuals react to disinformation messages. Using a proposed multi-method approach (including sentiment analysis of Twitter posts containing disinformation, social network analysis of influencers known to spread disinformation, biometric analysis of individuals exposed to disinformation, and lab/field experiments) the authors hope to show how these messages spread and the steps marketers, regulatory agencies, and other stakeholders can take to combat disinformation.

4 - Identifying and Predicting Fake-News Sharers within the Fake-News Ecosystem: Beyond Demographics and Ideology

Verena Schoenmueller, Bocconi University, Milan, Italy

Simon Blanchard, Gita Johar

The spread of misinformation or fake-news is a global concern that undermines progress on issues such as protecting democracy and public health. Past research aiming to combat its spread has largely focused on identifying its semantic content and media outlets publishing such news. In contrast, we aim to identify individuals who are more likely to share fake-news by studying the language of actors in the fake-news ecosystem (such as fake-news sharers, fact-check sharers and random twitter users), and creating a linguistic profile of them. Fake-news sharers and fact-check sharers use significantly more high-arousal negative emotions in their language, but fake-news sharers express more existentially-based needs than other actors. Incorporating psycholinguistic cues as inferred from their tweets into a model of socio-demographic predictors considerably improves classification accuracy

of fake-news sharers. The finding that fake-news sharers differ in important ways from other actors in the fake-news ecosystem (such as in their existential needs), but are also similar to them in other ways (such as in their anger levels), highlights the importance of studying the entire fake-news ecosystem to increase accuracy in identification and prediction. Our approach can help mitigate fake-news sharing by enabling platforms to pre-emptively screen potential fake-news sharers' posts.

FA04

Virtual Room 04
Retail Store Format, Product Availability, and Consumer Choice
Special Sessions
Chair: Tomomichi Amano
Harvard University, Boston, MA
Co-Chair: Sylvia Hristakeva
UCLA Anderson School of Management, Los Angeles, CA

1 - An Analysis of Dollar Store Entry on Local Market Structure

El Hadi Caoui, University of Toronto, Toronto, ON, Canada
Brett Hollenbeck, Matthew Osborne
This paper studies the expansion of dollar store chains in the U.S. retail landscape following the Great Recession (2008-2019). This expansion has been accompanied by growing public concern over the impact on other retailers and food accessibility in local communities. We develop an empirical framework to evaluate the impact of entry regulation on spatial market structure and consumers' shopping behavior. A dynamic game of entry, exit and investment into spatially differentiated locations is specified, allowing for chain-level economies of density. Reduced-form evidence and counterfactual simulations indicate that dollar store chains compete strongly with the grocery and convenience segments and are associated with lower access to fresh produce.

2 - Inference and Impact of Category Captaincy

Xinrong Zhu, University of Wisconsin-Madison, Madison, WI
This paper studies category captaincy, a vertical relationship whereby the retailer delegates pricing and assortment decisions of an entire category to one of the leading manufacturers within the category. These contracts, which are confidential, can lead to disproportionately higher market shares for the captain's products. The objective of this paper is to infer the existence of such contracts and to quantify their impacts on prices, market shares, and profits of manufacturers and retailers. I use the yogurt category as an empirical setting, in which the captain is either Dannon or Yoplait---the top two brands in the category by national market share. Using Nielsen scanner data, I first estimate a random-coefficient model of consumer demand. I use estimates of the brand-retailer specific shocks and a Bayesian inference model to classify retailers into one of the three categories: Dannon-captained retailers, Yoplait-captained retailers, or non-captained retailers. Conditional on the classified arrangements, I then apply conduct tests to infer that captains eliminate double markups from their own products, while the non-captain products still have double markups. The results from counterfactual experiments show that category captaincy arrangements increase market shares of the captain by about 50%, but they can also increase retailer profits and consumer welfare by eliminating double markups on the captain's products.

3 - Grocery Store Closures and Household Nutritional Choices

Sylvia Hristakeva, UCLA Anderson School of Managment, Los Angeles, CA
Julia Levine
Health practitioners and researchers link consumer dietary choices to health outcomes, highlighting the importance for improved understanding of what drives consumer nutrition. Differences in households' nutritional choices are likely driven by both demand and supply factors. We add to our understanding of supply-side factors, analyzing how access grocery stores may impact households' food purchases and the nutritional composition of food baskets. Our analyses exploit a novel variation in supply availability— temporary closures of grocery stores, which occur right after a hurricane passes through the geographic location. We identify households as treated if they frequented a closed store in the pre-hurricane period. We find that a temporary closure of a grocery store results in a decrease in purchases of healthy food for treated households relative to the control group. The impact on nutritional intake is large and persists for six months following the store re-opening, despite no contemporaneous effects on overall grocery expenditure. Next, we explore potential mechanisms for our main results, finding that treated households direct a larger share of their food expenditures to discount stores, even after the store has reopened. Hence, differences in prices and/or assortments across grocery and discount stores may explain the estimated changes in the composition of household purchase baskets.

4 - Roll-out of New Brands and the Role of Entry Costs

Tomomichi Amano, Harvard Business School, Boston, MA
Manufacturers commonly adopt a roll-out process in introducing new products to retailers. In the market for consumer packaged goods, firms are often observed to roll-out new brands gradually—expanding out from markets that are closer in physical distance, or similar in attributes to previously entered markets, such as belonging to the same retail chain. Roll-out within a retailer is not always uniform. We establish that entry costs are smaller for markets that are similar to ones in which the brand has already entered. These costs can be heterogeneous within a retailer. We illustrate that these costs can be consequential in dictating the path by which new products diffuse.

FA05

Virtual Room 05
Online Browsing and Shopping Behavior
Special Sessions
Chair: Beth Fossen
Indiana University, Bloomington, IN

1 - Understanding Consumer Journey Using Online Conversations

Lingling Zhang, China Europe International Business, Shanghai, China
Wei Shi, Amy Yiping Song
Consumer's shopping journey for healthcare services is increasingly moving online. Because of the high level of quality uncertainty, consumers often need to speak with online customer service agents to acquire more information before they make an appointment with healthcare providers. Therefore, the interaction with agents plays a critical role for the consumer journey outcome. However, little empirical research has systematically examined the effectiveness these conversations in terms of their content and dynamics. In this research, we have an opportunity to work with a leading dental clinic chain in China to observe their consumer journey in a major market for six months. Our data includes the complete footprint of the journey: from which channel the consumer is acquired (i.e., organic visits, search ads, and display ads), the detailed conversation exchanges with online agents, and whether the consumer agreed to make an appointment and perform the dental procedure. We apply machine learning techniques to understand the topic flow of consumer-agent conversations and examine how the conversation dynamics lead to different conversion outcomes. Our results demonstrate how to detect interested consumers in the early stage of online conversation and how the content and dynamics of conversation is associated with the

propensity of conversion. This research has direct managerial implications for healthcare providers to understand and influence online consumer journey through analytics.

2 - Ad-blockers and Online Consumer Behavior

Vilma Todri, Emory University, Atlanta, GA
Hyunkyung Lee
Digital advertising is on track to become the dominant form of advertising but ad-blocking technologies have recently emerged posing a potential threat to the online advertising ecosystem. A significant and increasing fraction of Internet users has indeed already started employing ad-blockers. However, surprisingly little is known yet about the antecedents and consequences of ad-blockers on consumers. This paper investigates such factors to better understand the phenomenon of ad-blockers in the Internet economy.

3 - Effectiveness of Micro Ads on Television

Beth Fossen, Indiana University, Bloomington, IN
Philip Kim, Inyoung Chae
Television advertisers and networks are showing increased interest in micro television ads, ads that are 10 seconds or less. Yet, limited research has considered micro ads on television. We investigate the effectiveness of micro television ads relative to longer ads by exploring the impact of television advertising by ecommerce retailers on traffic and sales on the retailers' websites following their television ads. Using a quasi-experimental research design, we find that micro television ads spur more traffic - as much as 21% more - to the retailers' websites post-ad than longer ads, while we do not find strong evidence that their impact on sales significantly differs from that of non-micro ads. Our analyses also reveal several ad characteristics that amplify the effectiveness of micro television ads. We propose three key distinctions about today's media viewers which may explain why they would react differently to micro versus non-micro ads. We find support that current viewers' reduced patience for longer ads may explain the effectiveness of micro ads. Our research provides timely insights for advertisers and television networks seeking economical, attractive ad inventory.

FA06

Virtual Room 06
AI and Societal Implications
Contributed Sessions
Chair: Lea Sollfrank
Goethe-University, Frankfurt, Germany

1 - Sell Me the Black-box! Regulating Explainable Artificial Intelligence (XAI) May Harm Users

Behnam Mohammadi, Carnegie Mellon University, Pittsburgh, PA
Kannan Srinivasan, Timothy Derdenger

Recent years have seen a surge in the adoption of Artificial Intelligence (AI) models for decision-making in various domains such as targeted advertising, healthcare, and finance. But most recent AI algorithms are complex black-box models whose underlying mechanisms are difficult to understand even by their creators. In life-changing situations such as criminal justice systems and medical diagnosis, however, it is crucial to know the chain of reasoning that leads to certain decisions made by AI. eXplainable AI (XAI) is a set of techniques that seek to address such concerns about AI transparency and trust by making AI outputs understandable to humans. The rapidly growing body of research on XAI coincides with the emerging issue of the regulatory and policy landscape for AI in jurisdictions across the world, such as GDPR in the EU. The common wisdom is that regulating AI and XAI leads to the betterment of society. This paper challenges this notion through a game theoretic analysis of total welfare in a duopoly with and without XAI. The results show that under certain conditions, there is little-to-no additional benefit from mandating XAI. In fact, it follows that XAI policies that require full explainability may actually make both firms and customers worse off, demonstrating a trade-off between maximizing welfare and receiving explainable AI outputs. We identify the factors that must be considered when designing XAI policies, and provide the managerial implications of our results for businesses.

2 - Understanding Algorithm Aversion: When Do People Abandon AIs When They See Them Err?

Yunhao Zhang, Massachusetts Institute of Technology, Cambridge, MA
Renee Gosline

Technological advancements have provided consumers the option to choose services provided by artificial Intelligence (AI) or human beings. Previous research (Dietvorst et al. 2015) has shown that consumers display algorithmic aversion when AI errs. We further explore this phenomenon by testing the boundaries of this effect, and how it compares to human-generated errors. In two experiments examining preference for an AI or a human forecaster in a statistical prediction task, we find that the degree of algorithm aversion varies with the size of the error made by the AI or the human forecaster. Algorithm aversion disappears as the AI's error becomes smaller or as the human forecaster's error becomes larger. We further find that algorithm aversion does not happen if an AI performs worse than one's expectation but happens when the AI's error is larger than one's expected human forecaster's error. A textual analysis further uncovers insights into understanding why subjects prefer an AI or a human forecaster. These analyses identify both individual-level heterogeneity of algorithmic aversion as well as the role of contextual cues. Overall, our findings suggest that firms should continue to improve their AI as consumers would tolerate AI's imperfection and appreciate its superior performance.

3 - The Role of Consumer Perceptions of the Ethics of Machine Learning in the Appropriation of Artificial Intelligence-based Systems

Christine Balague, Institut Mines-Télécom Business School, EVRY, France
Zeling Zhong

Generally, we expect Machine Learning (ML) in marketing to provide efficient recommendation systems, improvement in advertising with real time bidding, more accurate customers' behaviors predictions, and better CRM. This research focuses on the role of ML ethics, which is a combination of four ethical concepts: data privacy and security, fairness, accountability, and transparency of ML algorithms. The results show that ML ethics play a key role on consumer's behavior by positively influencing AI services appropriation. We use a PLS model to quantitatively measure AI services appropriation, as well as its antecedents (ML ethics and trust) and consequences (perceived value and NPS). We also reveal that fulfillment of contract obligations has a mediating role between ML ethics and trust in AI services. This research shows that marketers need to be responsible by focusing on the ethics of ML to answer AI users' needs and to enter in the Artificial Intelligence era

4 - The Effect of Gender Stereotypes in Voice Shopping

Lea Sollfrank, Goethe-University, Frankfurt, Germany
Ju-Young Kim

Voice-assisted commerce is on the rise. The underlying shopping process requires a voice-based interaction between user and assistant, which takes place with either a female or male voice assistant. It is unclear, however, how users perceive different genders of the assistant and thereupon evaluate the recommendation of the assistant. This evaluation may differ depending on the gender of the participant, the gender of the recommended product and the certainty the user has in the respective product segment. Drawing on levels of the self-categorization theory and the CASA paradigm as well as literature on gender stereotypes

in an AI context, we examine in two online experiments the impact of the participant's gender, the product gender and the assistant's gender on both perceptual measures (i.e. competence and trustworthiness) and behavioural measures (i.e. actively requesting help from the assistant and product choice). We expect from the results that lower certainty in the product segment will lead to increased consultation of the assistant and possible rescheduling of the product choice. We anticipate this to be particularly the case for a mismatch between participant and product gender and a match between product and assistant gender. We attribute the results in these settings to higher perceived competence and trustworthiness of the assistant. Preliminary findings show, that a lower certainty in the product segment as expected leads to a higher probability to consult the assistant as well as to a variation in the final product choice. They further indicate that a match-up between product and assistant gender can lead to higher perceived competence and trustworthiness of the assistant.

FA07

Virtual Room 07
Online and Mobile Marketing
Contributed Sessions
Chair: Grazia Cecere
Institut Mines-Telecom Business School, Evry, France

1 - Reducing Ad Waste: Optimal Targeting with Point Processes

Henrique Laurino dos Santos, Wharton School, University of Pennsylvania, Philadelphia, PA
Digital platforms offer marketers uniquely individualized channels to monitor and directly interact with consumers, and while those enable the design of more granular advertising policies, the complexity of optimizing those policies is also greatly increased. To maximize the effectiveness of advertising, marketers must choose who and when to advertise to under the consideration that users may be reachable in near-continuous time. Extant optimization models in advertising and direct marketing are broadly built to either be granular at the consumer or time level, but rarely both. This study presents a model for individual-level, continuous-time, purchase timing in the presence of consumer burnout. The model can flexibly accommodate a variety of advertising impulse-response equations and provides simple regularity conditions for the inclusion of endogenous usage-feedback loops as well as burnout mechanisms. I also introduce two stylized optimization tasks that represent the decision problems of a service provider

designing an advertising policy directly and of a digital platform hired to design short-term policies for the primary service provider. Under limited regularity conditions the model can be used to quickly estimate optimal advertising scheduling policies for both tasks, either through closed-form analytical solutions or simple numerical approximations. The model prescribes a long-term optimal minimal burnout level, with advertising frequency (and consumer burnout) decreasing as costs increase and increasing as the myopic agent's planning period decreases.

2 - Rational Addiction in Mobile Consumption

Jeeva Somasundaram, IE Business School, Madrid, Spain
Laura Zimmermann, Duc Pham Quang
Many consumers would like to reduce their smartphone usage but fail to do so due to the addictive nature of many smartphone applications. We build a theoretical model that examines the effects of myopic versus forward-looking habit formation as well as satiation models on consumption of a good. We empirically test our predictions by conducting two pre-registered randomized control trials that aim to reduce consumers' smartphone usage by providing temporary targets and monetary incentives over a period of time. When future targets and incentives are pre-announced, subjects conduct themselves in a forward-looking (rather than myopic) manner and reduce their mobile usage (rather than increase their consumption as predicted by satiation models) even before they are actually incentivized to do so. Subjects maintain a lower usage during the incentivized period and sustain a lower usage even after incentives are removed. Consistent with adjacent complementarity, we show that reduction in post-treatment usage is driven mainly by subjects who have lower usage during the treatment periods. However, we do not find any effect of reducing mobile usage on academic performance or well-being. Our manuscript thus provides empirical support for the theoretical framework of rational addiction in the domain of mobile usage by showing that pre-announcing future targets and incentives can be a cost-effective intervention to kick start behavioral change.

3 - Hitting the Right Target? Pricing and Advertising Strategies in Digital Markets

Grazia Cecere, Institut Mines-Telecom Business School, Evry, France
Wilfried Sand-Zantman, Sarah Lemaire
Display advertising markets rely on information provided by firms and consumers to provide ads to the right target. We investigate how a monopoly ad network should extract this information to price its advertising campaigns for commercial firms. We assume that the network is better able to identify the right target audiences but this requires it to know the firm's heterogeneous characteristics, both

in audience and value. We show how the network copes with this heterogeneity by altering the efficency of the targeting process and the prices charged to different types of firms. In particular, we show that narrower audience may be associated to lower prices to induce truthful information disclosure by firms.

FA08

Virtual Room 08
Choice Modeling I
Contributed Sessions
Chair: Sri Duvvuri
University of Washington Bothell, Bothell, WA

1 - Rethinking Product Display

Francisco Cisternas Vera, Assistant Professor, The Chinese University of Hong Kong, Hong Kong
Wee Chaimanowong

Decisions on product display have a strong influence on product demand. Desirable locations are well understood but competition effects are often overlooked. Intuitively, products located next to each other are more likely to compete. Specifically, relatively strong products draw demand from other products, and this effect is stronger for those in close proximity.When demand interactions are considered across the whole display are considered problem becomes NP-hard. In this work, we consider a model that allows correlations in demand upon the relative attractiveness of competing products moderated by their proximity and has been shown to outperform traditional models in fit and predictive power based on experimental data from physical retail stores. The resulting problem of maximizing profit based on this model is interesting in its own right as a non-linear integer programming problem. We explore various problem transformation, approximation techniques and exact solution to provide manager with general guidelines and suggestion to improve their own specific displays.

2 - Price Sensitivity and Retail Customer Analytics

Sri Devi Duvvuri, Quantitative Research Consultant, SD Associates, Kenmore, WA

In this research, we propose a method to classify customers on a price sensitivity continuum when the basket of goods is mixed--substitutes/complements/both. To identify a price sensitivity continuum, we calibrate a Bayesian multi-level factor analytic model using scanner panel data. To classify the customers further, we employ multivariate analyses (e.g., clustering) and validate the classification with survey data. Interestingly, the scanner panel data and survey data are derived from the same panel of customers provided by a

stand-alone retailer for garden products. We use hierarchical Bayesian inference tools (e.g. MCMC) to estimate the model parameters. Preliminary results indicate two price sensitivity clusters. We are in the process of generating retailer metrics using the model results in tandem with survey data.

FA09

Virtual Room 09
Information Acquisition in Consumer Choice (Session I)
Special Sessions
Chair: Arash Laghaie
Goethe University Frankfurt, Frankfurt, Germany

1 - Marketing to Rationally Inattentive Customers

Andrew Caplin, New York University, New York, NY

We develop a simple, dynamic model of market share that highlights interactions between social learning and private attentional choice. The key role of social learning in our model is to guide buyers not only on how much total attention to allocate to each decision, but also on precisely how to divide this attention up in an optimal manner. We show that allowing the agents the opportunity to gather information selectively after observing market behavior has a fundamental effect on individual learning and on the resulting market dynamics. In terms of marketing applications, the key point is that an outside observer with access to suitably rich data on market shares may be better able to understand preferences than are decision makers themselves. Agents in the model are learning optimally given their limited resources. They focus their attention on matters that concern them directly, but their powers are limited. One could imagine that a large agent, such as the government, Google, Amazon, or a market research firm such as J. D. Power and Associates or Consumer Reports, might have greater access to large amounts of detailed choice data as well as greater incentives process this information. Governments and research firms collect a broad range of statistics. Google sees the search behavior of a large fraction of agents. Amazon directly observes consumer choice. In this era of big data we show how such an agent might be able to put together detailed market data and might be able to learn type-dependent preferences.

2 - Inattention and Marketing

Filip Matejka, CERGE-EI, Praha, Czech Republic

We show what rational inattention implies for marketing. When consumers have limited ability to process information, but can choose what type of information to get, then consumers follow simplified strategies that feature mental accounting, limited consideration sets, brand loyalty etc.

3 - Discrete Choice in Marketing Through the Lens of Rational Inattention

Sergey Turlo, Goethe University Frankfurt, Frankfurt, Germany
Matteo Fina, Johannes Kasinger, Arash Laghaie, Thomas Otter

Models derived from random utility theory represent the work-horse methods to learn about consumer preferences from discrete choice data collected in experimental and observational settings. % in economics and marketing. However, a large body of literature documents a variety of behavioral patterns that cannot be captured by basic random utility models and that require different non-unified adjustments to accommodate these patterns.In this review article, we illustrate how a discrete choice model rooted in rational inattention (RI) theory nests a significant set of these patterns.We present illustrative simulations, discuss extant empirical work using experiments and observational data, and suggest how to develop an RI model for the analysis of discrete choice among multiple alternatives described along multiple attributes as encountered in prototypical discrete choice experiments and choice-based-conjoint analysis in marketing and economics.

FA10

Virtual Room 10
Causal Effects and Policy Decisions
Special Sessions
Chair: Venkatesh Shankar
Texas A&M University, College Station, TX

1 - Incentives to Work Out: Evidence from Randomized Field Experiments

Unnati Narang, University of Illinois at Urbana-Champaign, Urbana, IL

With rapidly increasing healthcare costs, both governments and firms are paying more attention to cultivating healthy lifestyles among consumers to reduce medical and financial burdens. However, consumer often struggle to fulfil their commitments to health-related goals, such as consistently going to the gym. This research examines the effects of financial and non-financial incentives on consumers' gym-going behaviors. We conduct a set of randomized field experiments in partnership with the campus recreation center at one of the largest U.S. public universities that garners around one million student, staff, and faculty visits each year. Specifically, we provide a set of financial and non-financial incentives to the members of the center and track their progress (i.e., number and types of workouts completed).

Our preliminary results show that financial incentives have a significant and sustained effect on members' workout completion. We also examine the effects of non-financial incentives, such as information about the workouts and individual's ranks among peers. Our research has implications for firms, health and fitness practitioners, policymakers, and researchers for designing effective incentive programs and improving overall consumer health and wellbeing.

2 - How Does Country-product Association Affect Choice? Evidence from the Restaurant Industry During COVID-19

Minjee Sun, University of Iowa, Iowa City, IA
Matthew Osborne, Verina Que, Hyesung Yoo

The purpose of this research project is to understand and quantify the different behavioral mechanisms that affect the demand for products associated with foreign countries during the COVID-19 pandemic. We explore whether consumers' ethnic restaurant choices are negatively correlated with the COVID-19 cases of the restaurant's country-of-origin, whether branding (foreignness of a restaurant's name) interacts with the impact of country-of-origin on restaurant choices. We further classify different potential underlying mechanisms associated with the observed consumers' responses. In addition, during this period, consumers were exposed to a series of polarizing events such as statements by political leaders or movements related to racism that could have triggered either positive or negative sentiments towards certain countries. We seek to disentangle health-related risk perception from other behavioral mechanisms such as political animosity or racism that are not directly related to health. We propose to test our hypotheses and explore mechanisms using a mixed-methods approach, combining insights from consumer choice experiments with those from field and media data. Our findings will have important implications for managers and policymakers regarding brand management and the diversity, equity, and inclusion in supporting the entry and stability of minority businesses.

3 - Do School Nutrition Mandates Affect Household Food Purchases?

Michael Patrick Palazzolo, University of California, Davis, CA
Zhiying Hu, Adithya Pattabhiramaiah, Kusum L Ailawadi

In 2012, a provision of the Healthy, Hunger-Free Kids Act (HHFKA) placed strict requirements on what types of foods could be offered at schools, increasing the healthiness of food available to students. Did changes to the healthiness of school meals, even in the absence of more generous meal subsidies, lead parents to substitute towards school meals, and away from purchasing meals for their kids from

supermarkets? We document that these changes did lead parents to purchase less food at the supermarket. Moreover, much of the reduction in food purchased from the supermarket appears to come from food categories traditionally associated with breakfast or lunch-the two meals for which food can easily be purchased from schools. We document differences in these effects along different dimensions, such as household demographics and taste for nutritious food. We also explore the existence of unintended consequences, such as a decline in the nutritional quality of supermarket food purchases. Our findings contribute to our understanding of how consumers make healthy eating choices. Often, we study such choices in the context of differentially priced goods-e.g., between a cheaper, less-healthy option and a more expensive, healthier option-or the introduction of new healthy goods-e.g., entry of new supermarkets or brands. The HHFKA provides a unique opportunity for studying what happens when the healthiness of existing food options improves. Our findings indicate that, all else equal, improvements in the healthiness of available foods offered in one avenue (schools) can encourage a substitution of household purchases away from other avenues (such as supermarkets).

4 - Sponsored Content and News Consumption Tradeoffs

Adithya Pattabhiramaiah, Georgia Institute of Technology, Smyrna, GA
Inyoung Chae

Media publishers are increasingly hosting sponsored content (SC), a type of native advertising that resembles editorial information but possesses commercial intent, on their websites. SC has grown increasingly popular for two reasons: first, it typically achieves higher response rates compared to banner ads. Second, SC is routinely co-created by advertisers' and the publisher's specialized journalistic groups, which affords publishers better control over the content. However, hosting SC is not free of risks because consumers may mistake SC for editorial content due to their high similarity. This study offers implications for assessing the profitability for publishers from hosting SC. Using rich micro data that track clicks and subsequent consumer engagement with editorial and sponsored content on a news website, the authors demonstrate that SC viewership hurts subsequent consumption of news. Consistent with the view that readers feel misled by SC's resemblance with editorial content, the negative effect is pronounced when the article headline appears to be editorial, but its content is mostly promotional. Notably, this negative impact of SC on user experience occurs despite its explicitly being labeled as sponsored content, following FTC guidelines. This adverse impact on reader engagement dissipates over subsequent visits and

results in no discernible effect on readers' subscription and churn tendencies. These findings urge publishers to carefully consider the revenue potential of SC against the potential loss in news traffic and to employ SC headlines that better match readers' expectations to mitigate such loss.

FA11

Virtual Room 11
Sustainability
Contributed Sessions
Chair: Erya Ouyang
Temple University, Philadelphia, PA

1 - The Perceived Desirability of Electric Vehicle Purchases: Motivational Drivers and the Impact of Incremental Economic and Time Expenditures

Richard T. Stuebi, PhD Student, Virginia Tech Pamplin College of Business, Blacksburg, V
Dipankar Chakravarti

To attain environmental sustainability, increases in pro-environmental behaviors (PEBs) are essential in virtually all consumption domains. Two penalties may inhibit a consumer from undertaking PEBs: an economic penalty involving an up-front price premium and an effort penalty requiring additional time expenditure. For different PEBs, these penalties may be high or low, and thus may pose different adoption barriers -- especially for consumers with different motivational orientations. For instance, an electric vehicle (EV) purchase may constitute a PEB for consumers motivated by environmental concern, whereas for other consumers an EV purchase may reflect an enthusiasm for innovative technology. This motivational difference may drive differential sensitivity to both the magnitude and type of penalty being faced, thereby affecting the perceived desirability of purchasing an EV. Although one might intuitively expect increased economic or time penalties to lower EV purchase desirability, some consumers may prefer elevated penalty levels, using them to publicly signify their environmental orientation. We examined these possibilities in a three factor, between-subject experiment manipulating motivation (environment vs. technology), incremental price (low vs. high) and incremental time cost (low vs. high). Our findings show that EV purchase desirability varies across the eight study conditions. Those motivated by environmental concern respond differently to economic and time penalties than those motivated by an enthusiasm for technology. Environmental concern not only lessens sensitivity to incremental time costs, but also

can reverse the customary negative relationship between price and purchase desirability. We identify factors that mediate the above effects.

2 - The Impact of Coronavirus Pandemic on Consumer Sustainable Consumption

Steve Zhang, PhD student, New York University Stern School of Business, New York, NY

Bryan K Bollinger, Randi Kronthal-Sacco, Levin Zhu

The coronavirus pandemic has significantly altered many aspects of our life. Although recent literature has studied how consumers change their behaviors in the new norm of social distancing (Chetty et al., 2020; Tucker and Yu, 2020), how the pandemic impacts consumers' sustainable consumption has not been studied. This question is of great importance to both brands and researchers for several reasons. First, Bollinger et al. (2020) show that sustainable products are more likely to have price premiums over their non-sustainable counterparts. Whether sustainable products can maintain this premium in the economic downturn due to the pandemic, especially when the first wave of coronavirus hit the US, remains unclear, and we explore its relative impact on sustainable versus non-sustainable consumption. Second, small and large-scale experiments have confirmed that outdoor exposure can shift consumers' sustainable behaviors (Nisbet and Zelenski, 2011; Alcock et al., 2020). The record number of outdoor visitations, due to the social distancing guidelines during the pandemic, has propelled us to hypothesize that outdoor visitations are among the mechanisms driving the coronavirus pandemic impact on sustainable consumption. Through the lens of social distancing, we combine public COVID case data and proprietary geo-location data with store-level retail scanner data to study how the coronavirus pandemic has changed consumers' consumption of sustainable products. Our preliminary findings suggest that social distancing impacts consumers' propensity to purchase products with labels promoting their sustainability.

3 - CSR Vs. ESG: Choice of Name Reflects Underlying Approach to Corporate Sustainability

Tushmit M. Hasan, University of Texas at Austin, Austin, TX

Verdiana Giannetti, Raji Srinivasan

There has been a growing pressure on firms to be cognizant of their impact on society and the environment, but there has been much debate regarding whether firms' engagement in corporate social responsibility (CSR) comes at the expense of shareholders. However, recently, there has been a renewed pressure on firms to improve their performance on environmental, social, and governance (ESG) issues, driven primarily by investors who are increasingly becoming interested in socially responsible investing (SRI). We believe that ESG is a re-emergence of the concept of corporate social responsibility (CSR) but with a key difference - we believe a firms' choice in using CSR vs. ESG in their communication reflects their approach towards corporate sustainability. Using a panel dataset of tweets from S&P500 firms between 2015-2020, we present empirical evidence of firms' difference in focus via topic modeling. We investigate the drivers of firms' choice to use CSR vs. ESG in their tweets. We also compare the stock market reactions to firms' CSR vs. ESG tweets. Our results indicate that by moving away from the narrative-based efforts of CSR towards goal-driven and metrics-driven ESG efforts, certain types of firms may be generating better returns by approaching corporate sustainability as ESG rather than as CSR.

4 - Can Vegan Product Distribution Mitigate Food Deserts Disparities? A Natural Experiment from Burger King

Erya Ouyang, Temple Univeristy, Philadelphia, PA

Yang Wang, Xueming Luo

Using a large foot traffic dataset from SafeGraph, we construct a natural experiment to study the demand effects of Burger King's plant-based protein product - Impossible Whopper- launch in the food deserts.We observe Point-of-Interest (POI) level daily visits before and immediately following the Burger King'sIntroduction of Impossible Whopper. Our results show an increased foot traffic to Burger King relative to that of nearby gas station locations. By decomposing the visits by food deserts and socioeconomic variables, we find that the growth in visits to Burger King is mainly derived from non-food deserts locations and driven by people who live in neighborhoods with higher white population and higher education level. Additionally, we observe a distribution effect of increased visits from Food Deserts to Burger King locations in non-food deserts. Furthermore, we show that increased demand effect of Impossible Whopper is spilled over to grocery stores that carry plant-based product. Collectively our results highlight the effectiveness of Impossible Whopper's introduction at mitigating partial food disparity issue in the food deserts.

FA12

Virtual Room 12

Consumer Behavior: Social Influence and Status

Contributed Sessions

Chair: Charles Light

University of Michigan, Ann Arbor, MI

1 - The Role of Emotions as Impression Management Device in the Sharing Economy

Camille Lacan, IAE University of Perpignan (CRESEM), Perpignan, France
Olga Goncalves

Host self-presentation strategy is key on digital platforms of the sharing economy and many hosts use their personal photo to shape their online impressions. Despite their importance, less is known for their influence on consumer decisions. This research fills the gap by examining how three emotional strategies (happiness, sadness and neutral) used by hosts in their profile picture influences the peer booking decision. Drawing on the impression management theory and a state-of-the-art deep learning model, this research reveals that hosts tend to display rather positive (happy face) and neutral emotions in their profile picture. However, the link between emotions and bookings is more complex than valence alone. Results indicate that there is a sadness penalty for female hosts and a happiness premium for male hosts, suggesting that gender is an important moderator of the emotional strategy. These findings offer guidance to manage its online self-presentation.

2 - Brand or Category Competition - The Effect of a Choice Set on Donation Decisions

Gil Peleg, Yeshiva University, NYC, NY
Oded Lowengart, Gal Gutman, Merav Weiss-Sidi

Charities, pro-social organizations, and social initiatives compete for private donations when they fundraise via gala events, social networks, fundraising websites, and other channels. The vast number of people and organizations soliciting donors for their money is enormous, making donors' decisions highly complex. Potential donors pick up ques from rival organizations and incorporate these ques into their decision process to simplify the donation decision process. This research identifies these ques and examines how potential donors incorporate them into their decision process in a brand-level and category-level competition. Across four online studies, we show that although the ques are similar in both levels of competition, the importance that donors assign to them differs when facing different choice sets. While, for organizations that fight for various causes (i.e., fighting cancer or fighting heart disease), the cause is what matters, other characteristics become more critical for organizations that fight for the same cause (i.e. fighting poverty). Our findings expand the understanding of donation decisions and contribute to practitioners by suggesting differential communication approaches aligned with the level of competition.

3 - Status as a Fundamental Motive, Status Consumption and Well-being

Georgios Tamiolakis, PhD student, AUEB, Athens, Greece
George Baltas, Gregory Painesis

From an evolutionary perspective, the pursuit of social status is a fundamental human motive that often drives consumption of luxury products. This study explores the relationships among status-seeking behavior, conspicuous consumption of prestigious products and subjective well-being. In particular, we examine the link between status as a fundamental motive, subjective evaluation of life satisfaction, and the experience of positive and negative emotions. We consider the possible mediating role of the consumption of luxury goods that symbolize success and achievement and we try to determine the relationships among these constructs. Evolutionary psychologists suggest that there are two viable, yet distinct, strategies to attain and maintain status in human societies: Dominance, i.e., the use of force, intimidation, and coercion to induce fear and attain a social status and Prestige, i.e., the possession and sharing of valuable skills or expertise to gain respect and recognition. Therefore, a general status motive may lead people to engage in either dominance-based or prestige-based routes to status attainment. Dominance and prestige are characterized by distinct traits, emotions and behaviors as well as distinct signaling mechanisms. This study develops and empirically tests a model that shows that the effect of status seeking behavior on an individual's subjective well-being is mediated by status consumption, only in the case of dominance-based strategy. Furthermore, we consider two distinct buying patterns of status consumption: bandwagon and snobbish status consumption. We find that bandwagon status consumption has a positive effect on well-being. Surprisingly, our findings reveal that snobbish buying behavior has a negative effect on well-being. In addition, the prestige-based strategy has a positive direct effect on evaluation of life satisfaction and emotions while the dominance-based strategy has a negative direct effect on the latter. Overall, it appears that the social aspects of consumption are more important drivers of well-being.

4 - How do Smart Citizens Favor Personal Data Markets under Surveillance Capitalism?

Charles Light, University of Michigan, Ann Arbor, MI
Yixuan Wang, Ranjan Pal, Bodhibrata Nag

We investigate and rationalize how individuals in a surveilled developing economic society value a human-centric data economy (HCDE). We first design and conduct a non-online pilot field experiment on approximately 22500 human subjects across smart cities in India from 2014-2019, and collect data reflecting the impact of monetary incentives on these subjects to voluntarily trade their (personal) data

in the digital surveillance age. Consequently, we study how various degrees of incentive influence subject preferences - both, when they are, or are not well-informed about the commercial malpractices their personal data might be subjected to. We analyze and rationalize (from the viewpoint of behavioral economics) two main observations in general for the Indian population: (i) despite being warned of the commercial malpractices associated with their personal data in the mobile and IoT age, they prefer to trade data for incentives, and (ii) the willingness of individuals to trade personal data is statistically heavy-tailed, and hints at following a weak power-law. The broader social impact of such HCDEs lie on three fronts: (1) a society preferring HCDEs will likely enable high-quality personal data to be collected by online (social) applications in a trustworthy fashion that subsequently will catalyse a much-improved AI-driven multi-stakeholder targeted advertising business, (2) the GDP-centric macroeconomic inequality in a developing economy might considerably reduce due to online (social) application users earning from their personal data, and (3) much to the like of these application businesses, users will invest in increased time and meaningful attention to the former that will act as upward spiral feedbacks on improved personal data collection.

FA13

Virtual Room 13
Information Design and Ecommerce
Special Sessions
Chair: Xiang Hui
Washington University in St. Louis, St. Louis, MO
Co-Chair: Meng Liu
Washington University in St. Louis, St. Louis, MO

1 - Safety Reviews on Airbnb: An Information Tale
Zhe Jin, University of Maryland, College Park, MD
Aron Culotta, Liad Wagman
Many online platforms facilitate and publish user reviews in order to build trust between anonymous buyers and sellers. At the same time, platforms can also monitor, filter, and remove certain user reviews, even if they reflect the true experiences of buyers. Using Airbnb and official crime data in five major US cities, we show that a recent Airbnb policy that discourages reviews about the safety of a listing's vicinity, if fully implemented, would hurt guests but increase revenues from reservations on Airbnb, with positive sorting towards listings with such vicinity safety reviews. Because vicinity safety reviews are more closely correlated with official crime statistics

in low-income and minority neighborhoods, our findings suggest that suppressing or highlighting vicinity safety reviews would have different effects on different neighborhoods.

2 - When Does a Brand-Influencer Matching AI Backfire?
Z. Jessie Liu, Johns Hopkins, Baltimore, MD
Yi Liu
We consider a social media platform that offers a matching service to match marketers with influencers through Artificial Intelligence (AI) technology. We find that, even if the implementation cost is negligible, it is not always in a platform's best interest to adopt such AI technology or to perfect its AI accuracy. The results arise from two countervailing effects on the participation incentives of influencers, which in turn affects the platform's profit. On the one hand, influencer marketing generates higher sales from a better influencer-marketer match, which benefits both influencers and the platform as they share a commission proportional to sales. On the other hand, if sales is high via an influencer's recommendation channel, more users may stop following the influencer if they bought a low-quality product. The former sales effect induces the influencer to participate in a marketing campaign, whereas the latter quality concern effect deters one from doing so. Furthermore, the proportional size of loyal followers moderates the trade-off between these two effects. We derive conditions under which adopting such AI technology is profitable for a platform. We also extend our baseline model to study when and how a platform should integrate its AI strategy with its communication strategy for product quality assurance.

3 - Multi-dimensional Salesforce Compensation with Negotiated Prices
Minkyung Kim, UNC Chapel Hill Kenan-Flagler Business School, Chapel Hill, NC
Pranav Jindal, Peter Newberry
In many settings where pricing is delegated to salespeople, firms provide the salespeople incentives to not only sell more, but also to do so at higher prices. In this paper, we study the relative importance of pricing-focused and revenue-focused incentives, and quantify the profitability of different designs for the pricing-focused incentives. Utilizing data from a large durable goods retailer in the U.S., we outline and estimate a structural model of multitasking salesforce where a salesperson jointly makes selling and negotiation decisions for multiple product types. We find that the disutility from negotiating varies by product type, and is comparable to that from selling. Eliminating pricing-focused (revenue-focused) incentives, while making the salesperson indifferent, lowers the retailer's profit by 11% (10%) pointing to the

relative importance ofpricing-focused incentives. Additionally, eliminating different features of pricing-focused incentives which vary in whether they incentivize salespeople to sell at higher or lower markups,result in lower profits for the retailer. These results are driven by (i) the possibility that effortsin selling and negotiating can either be substitutes due to effort cost considerations or complementsbecause of the demand response to change in prices, and (ii) the salesperson's ability toreallocate efforts across product types in response to changes in the compensation scheme.

4 - Targeted Incentives, Broad Impacts: Evidence from an E-commerce Platform

Xiang Hui, Washington University in St. Louis,
Saint Louis, MO
Meng Liu, Tat Y Chan

Digital platforms sometimes offer incentives to a subset of sellers to nudge behavior, possibly affecting the behavior of all sellers in the equilibrium. In this paper, we study a policy change on a large e-commerce platform that offers financial incentives only to platform-certified sellers when they provide fast handling and generous return policies on their listings. We find that both targeted and non-targeted sellers become more likely to adopt the promoted behavior after the policy change. Exploiting a large number of markets on the platform, we find that in markets with a larger proportion of the targeted population---hence more affected by the policy change---non-targeted sellers are more likely to adopt the promoted behavior and experience a larger increase in sales and equilibrium prices. This finding is consistent with our key insight that a targeted incentive may increase demand for non-targeted sellers when both platform certificates and the promoted behaviors are quality signals. Our results have managerial implications for digital platforms that use targeted incentives.

FA14

Virtual Room 14
Unstructured Data and Marketing I
Special Sessions
Chair: Shunyuan Zhang
Harvard Business School, Boston, MA
Co-Chair: Jochen Hartmann
University Hamburg, Hamburg, Germany

1 - The Role of Syntactic Entropy in the Effectiveness of Marketing Messages

Siham El Kihal, Frankfurt School of Finance & Management gGmbH, Frankfurt, Germany

A.Selin Atalay, Florian Ellsaesser

Language plays a key role in the effectiveness of marketing messages. Reaching a desired outcome requires arranging words to formulate a message (i.e., syntax). This task is not trivial. The authors study the role of syntax in marketing communications by focusing on syntactic entropy. Syntactic entropy refers to the average surprisal in the syntax of a message. A metric that captures syntactic entropy is introduced. The role of syntactic entropy in the effectiveness of marketing messages is tested using the syntactic entropy metric. In a series of studies including field data and randomized field experiments from contexts such as product descriptions, advertising, and product reviews, the authors show that the syntactic entropy of a message is related to its effectiveness. This relationship follows an inverted U-shape, such that medium syntactic entropy messages are most effective. The authors demonstrate how these findings can be used to write effective marketing messages. In two experiments conducted on Facebook, in collaboration with two independent companies, it is shown that all else being equal, ads written with medium syntactic entropy result in higher click-through rates than ads written with low or high syntactic entropy.

2 - Diversity in Advertising in Times of Racial Unrest

Oded Netzer, Columbia University, New York, NY
Jochen Hartmann, Rachel Zalta

Firms often attempt to reflect age, gender, and/or racial diversity in their promotional material. At the same time, recent social movements such as BlackLivesMatter (BLM) or MeToo have raised the awareness of social inequalities and biases that are omnipresent in our everyday lives. This research investigates racial diversity in U.S. advertising both in terms of supply—how diverse are the ads presented to consumers, and in terms of demand—how do consumers react to diverse vs. less diverse ads. If diverse ads lead to favorable consumer reaction, this could lead to a win-win opportunity that could accelerate the representation of minorities in advertising. We further explore how the diversity in advertising has changed around the BLM protests surrounding the murder of George Floyd. To explore the diversity in advertising, we obtained a unique longitudinal dataset covering tens of thousands of display ads with hundreds of billions of impressions. We use robust, state-of-the-art machine learning methods to understand diversity compositions on these ads.Between January 2019 and July 2021, we observe an overall positive trend in terms of including minority models in digital ads (esp. Black models) as well as in terms of consumers' response to ads that feature Black models (in terms of click-through rates). The murder of George Floyd in May 2020, which has caused a global wave of

protests about racial inequality, is associated with a temporary increase of the inclusion of Black models in advertising and more positive reaction of consumers to ads with Black models. However, both these effects levelled off quickly. Overall, our results suggest social movements like BLM can spill over to advertising, enabling a win-win strategy that may help expedite diversity in advertising.

3 - What Makes for a Good Thumbnail? Video Content Summarization into a Single Image

Jasmine Yang, Columbia University, New York, NY
Oded Netzer

Given the unprecedented proliferation of video content available on digital platforms, thumbnails - reduced-size preview images or clips - have become increasingly important in helping consumers navigate through videos during their search process. Conventional wisdom holds that like a book cover or a movie poster, an effective thumbnail should be both attractive and serve as a synthesis or summary of the video content, allowing viewers to decide which video to watch. Despite their importance, little attention has been given in the marketing literature to explore how viewers choose and react to videos based on thumbnails, and consequently what makes for a good thumbnail to summarize and promote videos. In this research, we explore the relationship between the thumbnail of a video (relative to the video content) and viewers' subsequent video reactions (e.g., views, watch duration, and engagement). We analyze thumbnails from the perspective of image content, aesthetics and emotions using state-of-art text-mining, computer vision and deep learning tools. Based on the extracted features at both the thumbnail and video frame level, we construct a set of measures to study how thumbnails relate to videos, and draw on the expectation-disconfirmation theory to explain viewers' video reactions based on thumbnails. Our results suggest that, when it comes to videos, clickbait thumbnails may lead to lower engagement and retention of video viewership, and highlight the importance of using content representative frames. We propose optimal thumbnails to use for different video outcomes and emphasize the importance of embracing thumbnails in creators' promotion workflows for better video engagement.

4 - Winning the Attention Race: Analyzing Video Popularity and Content Evolution on TikTok

Zijun Tian, University of Pennsylvania, Philadelphia, PA
Ryan Dew, Raghuram Iyengar

We explore the empirical regularities governing the diffusion of content on the recently popular social media platform TikTok, including video and hashtag-level drivers of content popularity. TikTok is a unique social media platform focused on the sharing of short videos. Similar to social media platforms like Twitter, TikTok features hashtags that organize user generated content. However, unlike other social media platforms, TikTok also features a special type of hashtag, the challenge, that encourages users to generate (rather than merely share) content matching a particular theme. Combining both classical ideas from the literature on diffusion on social networks with cutting-edge multiview representation learning methods, we explore how these challenges grow in popularity, what factors explain the popularity of both challenges and videos within them, and how the content within hashtags evolves over time. These insights have implications for firm management of social media campaigns.

Friday, 10am - 1:30PM

FBC01

Virtual Room 01
Gary Lilien ISMS-EMAC-MSI 2022 Practice Prize Finalists
Special Sessions
Chair: Lan Luo
University of Southern California, Los Angeles, CA

1 - Effect of Front-of-pack Labels on the Nutritional Quality of Supermarket Food Purchases

Paulo Albuquerque, INSEAD, Fontainebleau, 77305, France
Pierre Dubois, Natalie Rigal, Bernard Ruffieux, Pierre Chandon, Olivier Allais, Céline Bonnet, Patrice Bertail, Pierre Combris, Saadi Lahlou

To examine whether four pre-selected front-of-pack nutrition labels improve food purchases in real-life grocery shopping settings, we put 1.9 million labels on 1266 food products in four categories in 60 supermarkets and analyzed the nutritional quality of 1,668,301 purchases using the FSA nutrient profiling score. Effect sizes were 17 times smaller on average than those found in comparable laboratory studies. The most effective nutrition label, Nutri-Score, increased the purchases of foods in the top third of their category nutrition-wise by 14%, but had no impact on the purchases of foods with medium, low, or unlabeled nutrition quality. Therefore, Nutri-Score only improved the nutritional quality of the basket of labeled foods purchased by 2.5% (−0.142 FSA points). Nutri-Score's performance improved with the variance (but not the mean) of the nutritional quality of the category.

In-store surveys suggest that Nutri-Score's ability to attract attention and help shoppers rank products by nutritional quality may explain its performance.

2 - Reducing Net Product Returns through Green Nudges and Causal Machine Learning

Oliver Hinz, Goethe University Frankfurt, Frankfurt, Germany
Moritz von Zahn, Cristina Mihale-Wilson, Kevin Bauer, Maximilian Speicher, Johanna Jagow

As free customer deliveries are becoming a standard in E-commerce, product returns pose a growing challenge to online retailers and society. For retailers, product returns create considerable costs associated with transportation, labor, disposal and infrastructure to manage returns. From a societal perspective, increasing product returns contribute to increased pollution, additional trash, and often a waste of natural resources. Due to these costs, companies and society are interested in reducing product returns. However, despite strong entrepreneurial and public interest in minimizing product returns, retailers on a micro level possess only very few effective instruments to minimize product returns without harming customer demand and net sales. In this work, we propose a novel product return prevention instrument (Smart Green Nudging) that leverages Causal Machine Learning (CML) and the availability of rich customer and contextual data sources to identify and nudge selected customers towards better shopping choices that will yield reduced product returns without diminishing customer demand and net sales. We evaluate the performance of the proposed returns prevention instrument with real-world data from the German online shop of a large European retailer. We demonstrate in a randomized field experiment with ~1 million visitors that showing a green nudge to all customers (Naïve Green Nudging) can reduce product returns but also incurs a decrease in demand, which however ultimately translates to higher net profits. Further, we demonstrate the superiority of Smart Green Nudging over Naïve Green Nudging in terms of both product returns and firm profits. Specifically, in our randomized field experiment, when compared to Naïve Green Nudging, the Smart Green Nudging strategy curtails product return by additional +1.23% and increases profits by additional +3.61%. Overall, this paper demonstrates the efficacy of using state-of-the-art CML to customize minimally invasive behavioral nudges in the digital environment as a means to tackle business and societal problems.

3 - Personalization in Email Marketing: The Role of Non-informative Advertising Content

Navdeep S Sahni, Stanford University, Stanford, CA
Chirstian Wheeler, Pradeep Chintagunta

We collaborated with three companies selling a diverse set of products, and conducted randomized field experiments in which experimentally tailored email ads were sent to millions of individuals. We found consistently that personalizing the emails by adding consumer-specific information (e.g., recipient's name) benefited the advertisers. Importantly, such content is not about the advertised product or the company. In our main experiment, we found that adding the name of the message recipient to the email's subject line increased the probability of the recipient opening it by 20%, which translated to an increase in sales' leads by 31% and a reduction in the number of individuals unsubscribing from the email campaign by 17%. We present similar experiments conducted with other companies, which show that the effects we document extend from objectives ranging from acquiring new customers to retaining customers who have purchased from the company in the past. Our investigation of several possible mechanisms suggests that such content increases the effort consumers make in processing the other content in the rest of the advertising message. Our paper quantifies the benefits from personalization and sheds light on the role of noninformative advertising content by analyzing several detailed measures of recipient's interaction with the message. It provides external validity to psychological mechanisms and demonstrates their practical implications for the firms designing their advertising campaigns.

4 - Promotional Campaign Duration and Word-of-Mouth in Solar Panel Adoption

Bryan K Bollinger, NYU Stern School of Business, New York, NY
Kenneth Gillingham, Stefan Lamp, Tsevtan Tsevatov

Intensive marketing campaigns can be used to increase awareness, consideration, purchase, and word-of-mouth (WOM) of pro-social products. With expanded interest and belief in how social norms and spillovers might be leveraged to combat climate change, it is critical to understand how campaigns designed to leverage such peer effects can be best designed. In this paper, we study the role of campaign duration on solar photovoltaic adoption using a large-scale field experiment, in which we randomly assign communities to campaigns with shorter durations, increasing the marketing intensity to maintain the same total resources per campaign. We find that the shorter and longer campaigns are equally effective while they are running, but the longer campaigns generate more WOM and therefore lead to more adoption post campaign than the shorter campaign. The shorter campaigns led to 34.8 fewer installations per town in the two years after the campaigns concluded, increasing the cost per acquisition from $1,566 to $4,367, the former being substantially lower than installers' self-reported acquisition costs, and the latter being substantially higher.

Friday, 10:15–11:15am

FB02

Virtual Room 02
Pricing II
Contributed Sessions
Chair: Wei Miao
University College London, London, United Kingdom

1 - Algorithmic Pricing and Adaptive Bias: Evidence from Insurance Industry

Ozge Demirci, University of Warwick, London, United Kingdom

Firms today use algorithmic pricing to set prices in an automated way. Insurance companies also use pricing algorithms to offer quotes which are usually different for men and women. As male and female drivers differ in their accident and claim statistics, pricing algorithms use this as a reason for gender-based pricing. Although this can be efficient for firms to differentiate between risk groups, it is also statistical discrimination to take someone's group belonging into account while pricing them. This paper focuses on the recent policy change in California requiring gender-neutral pricing in auto insurance. By exploiting the variation across states and using a difference-in-differences method, I show that the insurance price gap between male and female drivers decreased by 6 percentage points after the policy. It reduced premiums for young males, the riskiest group, but they increased for young females, as companies cannot differentiate between these two groups now. Leveraging different machine learning methods, including penalized regressions and random forest, I estimate consumer features that predict gender. By extracting data from thousands of insurance filings, I construct a unique dataset that captures pricing algorithms for different insurance providers. I show that insurance pricing algorithms start to proxy gender with other information already collected by firms. Hence, these characteristics correlated with gender gain more weight in the pricing algorithm. Drivers using specific car models associated with young males, the riskiest group, end up paying up to 20 percent more irrespective of their gender and driving records. It is an example of how well-intended regulatory policies can adapt discrimination in other forms rather than eliminating thoroughly. This paper aims to contribute to the growing literature investigating how algorithmic pricing may perpetuate the bias embedded in previous customer data, even though the anti-discrimination policies aim to achieve more equity.

2 - Does Price Discount Satisfy Consumers and Lead Them to Consume Efficiently?

Yeji Lim, California State University, Fullerton, CA
Kyungsik Nam

This paper proposes a consumer's dynamic utility maximization model with inequality constraint when firms adopt a tiered pricing scheme to promote efficient electricity consumption. There have been only a few relevant marketing literatures for electricity price because electricity conceptually tends to be considered a public good. However, electricity is a private good in the sense that consumers should pay for their consumption, and firms need to satisfy consumers with their service. As consumers have been working at home for the last two to three years due to the COVID-19 pandemic, moreover, consumers' dependency on electricity has been increased. Since even policymakers have interests and concern the stable supply to maintain the quality of the consumer's life, the firms' problem in this market has become more complicated. To solve the firms' pricing, profit maximization, and consumer retention, it is critical to understand how consumers behave under the tiered pricing with an energy efficiency program. Using the large empirical data extracted from the Korea Electric Power Corporation (KEPCO) of the Republic of Korea, we analyze the consumers' dynamic model and estimate the consumers' behavioral choices over time. We find that consumers' utility turns out to be higher when the marginal price is lower than the satisfaction factor for electricity consumption. Also, we find that the pricing discount cannot lead consumers to consume electrics efficiently in the long run, although firms discount marginal prices for efficient consumption.

3 - Online Content Paywall Configurations: A Randomized Field Experiment

Lucas Stich, Ludwig-Maximilians-Universität München, München, Germany
Robert Rußell, Benedikt Berger, Martin Spann, Thomas Hess

Digitalization has exacerbated the monetization of news content, such that insufficient digital advertising revenues have pushed news publishers to introduce digital paywalls and freemium models to monetize their digital content, restricting free content offerings in terms of either choice (premium paywall) or quantity (metered paywall). However, the effectiveness of digital paywall configurations and their potential interactions remains uncertain, particularly with regard to converting free users into paying subscribers. Leveraging user-level activity data from a field experiment with more than 19.8 million anonymous users at a large U.S. news website, this research measures the effects of a new metered paywall, added to an existing premium paywall, on

users' conversion, consumption, and retention behaviors. Among users consuming enough content to be affected by the metered paywall, the introduction of the paywall resulted in a significant decrease in the number of website visits and article views, but increased the likelihood of conversion. Furthermore, comparing the retention rates of subscribers across experimental groups suggests variation in the shares of subscribers retained after two months. These results have relevant implications for media companies seeking to design an optimal digital paywall configuration.

4 - Foe or Friend: Flat-rate Pricing and Market Outcome in the Ride-hailing Market

Wei Miao, Assistant Professor, University College London, London, United Kingdom
Junhong Chu

Flat-rate pricing has become increasingly popular in the ride-hailing industry. We take advantage of a policy change in which a leading ride-hailing company in Singapore introduced an origin-destination-based flat-fare option to study the causal effects of flat-rate pricing on drivers' shift income, labor supply, as well as riders' welfare. With a series of generalized difference-in-differences analyses, we find that the introduction of flat-rate pricing led to higher shift income for drivers. Our mechanism analyses further show that the increased shift income was not due to changes in the extensive margin of drivers' labor supply: Affected drivers did not extend their shift hours; rather, it was caused by the improvement over drivers' intensive margin of labor supply: The flat-rate option incentivized drivers to take more efficient routes with shorter durations on both flat-rate trips and metered trips, and the saved driving time enabled drivers to take more trips without needing to extend shift hours nor reduce break time. Meanwhile, flat-rate option also improves riders' welfare because riders can now reach their destinations faster without being detoured. This suggests that flat-rate pricing was not a zero-sum game between drivers and riders but a win-win strategy for both sides of the ride-hailing market.

FB03

Virtual Room 03
Influencer Marketing VI
Special Sessions
Chair: Andreas Lanz
HEC Paris, Paris, France
Co-Chair: Renana Peres
The Hebrew University, Jerusalem, Israel

1 - Does it Help to be Creative on Tiktok?

Marc Bravin, University of Lucerne, Lucerne, Switzerland
Melanie Clegg, Reto Hofstetter, Marc Pouly
Jonah Berger

It is often suggested that originality boosts success on social media, yet content with surprisingly low originality oftentimes becomes viral. For instance, millions of TikTok users copy each other by performing the same trending dance. Using more than 490,000 videos from TikTok, we train a machine learning model that enables us to examine when and how originality helps or harms the liking of content. Counterintuitively, we find that originality rather backfires and reduces content liking.Our approach is as follows: First, we train a machine learning model to determine the originality of each video. The model is based on a 3D convolutional neural network, which simultaneously maximizes the similarity between transformed views of the same video and minimizes the similarity between transformed views of different videos. The resulting extracted semantic video embeddings are used to calculate the local outlier factor (LOF), defined as the density deviation of a data point to its k neighbors.Second, we use the LOF as independent variable to predict the likes a dancing video receive in multiple regression models. In our first model, we find a significant negative effect of originality on the number of likes. We control for user and music fixed effects in models 2 and 3, respectively, and find that the coefficient decreases consistently with this assumption. Model 4 includes four additional controls (number of days the video was online, popularity, and originality × popularity). We find that the later a user adopted a song in the sequence of adopters, the more likes the video receives (interpreted as higher popularity). We find a significant interaction between popularity and originality, showing that the harmful influence of originality is dampened for later adopters. Two additional lab experiments test and demonstrate the causality of the negative originality effect.

2 - Growing Sales with Influencers in Livestreaming Commerce

Xian Gu, Indiana University, Bloominton, IN
Xiaoxi Zhang, Pallassana K Kannan

The rapid growth of high-speed mobile internet and technology has enabled live video streaming to become ubiquitous in recent years. As a result, livestreaming commerce, which combines live video streaming and e-commerce, has become quite popular. Despite its popularity, little is known about which factors contribute to the success of livestreaming commerce and how businesses should develop their product promotion strategies to maximize sales during a live event. In this research, we focus on the contribution of influencers (streamers) to sales

and the two major factors that businesses consider when choosing influencers to livestream their sales events: the popularity of influencers and the number of influencers. Marketers may choose to employ a single influencer with a large number of followers (a big influencer) to reach a large audience (a popularity-focused strategy) or they could reach an audience of similar size using multiple small influencers (a quantity-focused strategy). Using data from live events on the Chinese version of TikTok, we empirically quantify the effectiveness of both the popularity-focused and the quantity-focused influencer strategies on product sales. In particular, we find that a single big influencer can outperform ten small influencers promoting the same product. Moreover, we uncover an interesting negative interaction between the two strategies, implying that pursuing both popularity-focused and quantity-focused strategies at the same time may not always be ideal. Based on additional analyses, we highlight important differences between the popularity-focused and quantity-focused strategies across various livestreaming characteristics.

3 - Friend or Foe: The Impact of Video UGC on Video Game Sales and Usage

Jinhee Huh, University of Calgary, Calgary, AB, Canada
Lingling Zhang, Pallassana K Kannan

Consumers increasingly use online videos to share experiences about products. Compared with text-based content, user-generated video (UGV) content is more visual and auditory and thus can be more engaging. However, it runs the risk of spoiling the consumption experience, especially for information goods. In this research, we examine the impact of UGVs on sales and usage for online video games. We compile a unique and comprehensive data set from multiple sources and specify a dynamic panel data model to estimate the heterogeneous effects of UGVs. Our results indicate that UGVs by popular influencers have a positive impact on sales and the effect is stronger for games from small developers; however, such positive effect dissipates post purchase. In contrast, UGVs by less popular influencers hurt non-strategy game sales and usage. With an affective content analysis, we demonstrate how UGVs from influencers of different popularity levels differ in their audio and visual features, which further affect viewers' responses. Our findings have managerial implications for the video-game industry. Video-game developers can use our research to determine the appropriate policies on whether and how UGVs can be uploaded, promoted, and monetized.

4 - Second Screening While Watching TV: The Role of Different User Groups and Effects on Repeat Viewing

Renana Peres, The Hebrew University, Jerusalem, Israel
Sarah Gelper, Mitchell Lovett

TV viewers often use other devices such as their mobile or tablet while watching. Such second screening is of interest for practitioners to enhance engagement and increase viewership. This paper studies the determinants, usage, and effects of second screening, accounting for a broad set of influences such as online and offline communications and exposures to show promos. We use large-scale individual-level data from mobile diaries of 1,702 US TV viewers on 2,755 primetime TV shows over 3-6 weeks. The data are augmented with show airing, promo exposure, and individual-level people meter data. Second screening occurs in 16% of the viewing reports. 56% of the second screening is unrelated to the show, and 44% is show-related communication or information search. Latent class analysis identifies four viewer segments: heavy viewers, sports enthusiasts, sitcom viewers, and light viewers. The heavy viewer segment is more likely to do show-related second screening. Causal forest analysis shows that communicating about a show while viewing has a positive impact on the viewing intentions while unrelated second screening has a negative effect. However, this dual effect holds only for the heavy viewer segment and for infrequent viewers of the show, and only for viewing intentions, not actual viewing.

FB04

Virtual Room 04
Retailing I
Contributed Sessions
Chair: Zhonglin Li
University of Chicago Booth School of Business, Chicago, IL

1 - Rising Retail Concentration: Superstar Firms and Household Demand

Justin Leung, National University of Singapore, Singapore
Zhonglin Li

This paper investigates market concentration in the US retail sector. We use store- and household-level consumption micro-data from 2004-2019 to document four facts linked by a decomposition: 1) rising national concentration, 2) negligible change in regional concentration, 3) rising household concentration and heterogeneity across households, and 4) increased one-stop shopping. On the supply side, we find that increasing local availability of superstar retailers, rises in product variety, and changes in pricing explain a portion of these trends. On the demand side, we find that increases in

households' opportunity cost of time are also key drivers. We develop a model that can rationalize these results to highlight the implications for market power and welfare.

2 - The Influence of Product Location Changes on Consumer In-store Consideration and Choice

Ella J Xu, New York University, New York, NY
Bryan K Bollinger, Raluca Ursu

In this paper, we study the role of in-store product location changes on consumers' decision-making processes. We study this question with a novel data set that combines product sales and household transaction data with in-store consumer eye-tracking data. We find that changes in product locations disrupt consumers' habitual buying behavior. Consumers have a tendency to begin their search close to the previous location of products they purchased before, and their searches are less focused after these product locations change. This then leads consumers to consider products they have not previously purchased. After a previously purchased product moves, we find that consumers are more likely to purchase other products that are proximate to both the previous and new locations of their previously purchased products, especially those from brands they have not yet purchased. These findings have implications for retailers reorganizing their store and aisle layouts, and for manufacturers for whom consumers' habitual buying processes provide barriers to new consumer acquisition and/or increased brand and product loyalty.

3 - Permanent Income and Marketing Outcomes

Randolph E Bucklin, UCLA, Los Angeles, CA
Rafael Becerril

The marketing literature has documented that the income elasticities of marketing outcomes tend to be relatively small, suggesting that income may not be an important driver of consumer behavior. On the other hand, marketing practitioners attribute a more significant role to consumer income. We explore whether income effects on marketing outcomes are significantly larger when measured in terms of permanent income instead of reported income, as in the consumer panel data typically available to marketers. To compute permanent income, we rely on a standard method in macroeconomics and adapt it for use on Nielsen Homescan panelists. We find that, unlike reported income, permanent income predicts marketing outcomes such as basket size, the number of products and brands in the basket, the proportion of expenditure allocated to produce, and use of coupon. We estimate the permanent income elasticity of grocery expenditure to be 0.37, whereas the reported-income elasticity estimate is 0.05.

4 - Big-box Store Expansion and Consumer Welfare

Zhonglin Li, University of Chicago Booth School of Business, Chicago, IL
Justin H Leung

Supercenters and warehouse clubs have grown rapidly in the US in recent decades. These big-box retail establishments are physically large to enable one-stop shopping, offering a broad range of product categories with relatively low prices. In this paper, we study how the entry of these big-box stores affect household consumption and welfare. We first present an event study of the store entries of four major big-box retail chains to provide empirical evidence that households change various dimensions of their shopping behavior, such as product varieties per shopping trip and prices paid, in ways that are strongly consistent with store characteristics. We then develop a novel multi-store multi-category choice model to quantify and disentangle the effects of product variety, prices, and other store characteristics on consumer welfare. We show that households benefit substantially from consuming in supercenters relative to competing retailers, highlighting the importance of the store format.

FB05

Virtual Room 05
Location Analytics and Consumer Location Intelligence
Special Sessions
Chair: Natasha Zhang Foutz
University of Virginia, University of Virginia, Charlottesville, VA, 22904
Co-Chair: Baohong Sun
Cheung Kong Graduate School of Business, New York, NY

1 - Incorporating Co-locations into Deep Heterogeneous Network Representation Learning for POI Prediction

Hanyu Zhang, Emory University, Atlanta, GA
Kunpeng Zhang, David A Schweidel

Mobile location data has been used to deliver targeted advertising and predict future behavior. Yet, most marketing research leveraging such data focuses on the behavior of individual consumers. In this research, we empirically assess the value of incorporating co-location networks into a predictive model of future point-of-interest (POI) visits. To do so, we first formulate a heterogeneous information network capturing semantic relations among different types of entities

(e.g., users and POIs). We then implement a deep network representation learning method to investigate the latent and complex relations among users and POIs. Our preliminary results demonstrate that the addition of the co-location network improves predictive performance by 108.75% compared to baseline models that ignore such data. Our findings demonstrate the potential use for mobile location data to construct such networks to support marketing efforts.

2 - Persistence of Consumer Lifestyle Choices: Evidence from Restaurant Delivery During COVID-19

Daniel M McCarthy, Emory University, Atlanta, GA

We study the impact of the COVID-19 pandemic on customer purchasing behavior in the restaurant delivery category in the and, particularly, the extent to which pandemic-driven shocks to purchasing behavior have persisted even as consumers' lifestyles are returning to a new normal. We apply age-period-cohort (APC) models, commonly used in sociology but with limited adoption in marketing, to nonparametrically decompose customer behavior into acquisition cohort, tenure, and calendar time effects. This approach, in conjunction with an event study approach, allows us to flexibly estimate the time-varying effects of ubiquitous events such as COVID, where no contemporaneous control group is available, by comparing the behavior of cohorts acquired at different times. We estimate that pandemic-related disruptions initially more than doubled customers' aggregate spending. As of Summer 2021, the lift in sales was still approximately one-third of its early pandemic peak, despite evidence that the pandemic-driven shocks driving the initial lift had abated, due to a sizeable segment of customers continuing to purchase at elevated rates. This persistent behavior is consistent with some consumers having formed habits around delivery. However, this persistence appears to gradually decay over time, suggesting that habits acquired during COVID may not last indefinitely.

3 - Profiling user Decisions on Choosing POIs

Charles Liu, University of Tennessee- Knoxville, Konxville, TN

While Point-of-Interest (POI) recommendation has been a popular topic of study for some time, little progress has been made for understanding why and how people make their decisions for the selection of POIs. To this end, in this paper, we propose a user decision profiling framework, named PROUD, which can identify the key factors in people's decisions on choosing POIs. Specifically, we treat each user decision as a set of factors and provide a method for learning factor embeddings. A unique perspective of our approach is to identify key factors, while preserving decision structures

seamlessly, via a novel scalar projection maximization objective. Exactly solving the objective is non-trivial due to a sparsity constraint. To address this, our PROUD adopts a self projection attention and an L2 regularized sparse activation to directly estimate the likelihood of each factor to be a key fac-tor. Finally, extensive experiments on real-world data validate the advantage of PROUD in preserving user decision structures. Also, our case study indicates that the identified key decision factors can help us to provide more interpretable recommendations and analyses.

4 - Cables Instead of Bottles? The Role of Digital Divide in Reducing Crimes Associated Alcohol Consumption

Fanruo Wang, University of Rochester, Rochester, NY
Weiguang Wang, Fanruo Wang

Since various evidence has shown that alcohol is a breeding ground for crime, regulatingalcohol consumption has been a desired but challenging task is society. Historical prohibitionon alcohol supply and consumption resulted in unwanted consequences, which furtherescalated crimes. While studies focus on negative outcomes during regulations, it is unclearwhether retaliatory alcohol consumption would lead to adverse results once regulation is removed. This paper investigates this question by taking a perspective of digital divide. AsInternet has deeply penetrated into our daily life, it becomes addictive with theoretically andbiologically similar mechanisms as alcohol. By leveraging the difference in liquor regulationduring COVID-19 pandemic in Maryland and Pennsylvania, this paper utilizes over 1.6 millionmobile location observations of 6,474 users and combines various data sources. Usinga difference-in-differences model, we confirm an increase in crimes caused by the retaliatoryalcohol consumption. Further, an investigate on the role of Internet use shows surprisingfindings. We find that people with high-speed internet are less likely to resume alcohol purchasesafter reopening, which consequentially reduced the crimes. Further analyses indicatethe substitution between Internet and alcohol is particularly strong in addressing drinkers' socialexpectancies instead of the expectancies of tension reduction.

FB06

Virtual Room 06
AI Adoption
Contributed Sessions
Chair: Yingda Lu
University of Illinois-Chicago, Chicago, IL, 60607,

1 - An AI Method to Score Celebrity Visual Potential from Human Faces

Xiaohang Feng, Carnegie Mellon University, Pittsburgh, PA
Shunyuan Zhang, Xiao Liu, Kannan Srinivasan
Alberto I Duran

Celebrities have extraordinary abilities to attract and influence others. Predicting celebrity visual potential is important in the domains of business, politics, media, and entertainment. Can we use human faces to predict celebrity visual potential? If so, which facial features have the most impact on celebrity visual potential? We develop a three-step empirical framework that leverages computer vision techniques to predict celebrity visual potential from face images. In the prediction step, we optimize a ResNet-50 deep learning model on a large dataset of 6,000 celebrity images and 6,000 non-celebrity images and achieve 95.92% accuracy. In the interpretation step, we draw on psychology, economics, and behavioral marketing literature to select 11 interpretable facial features (e.g., width-to-height ratio). We calculate the direction and strength of the feature's correlation with celebrity visual potential. We find that the facial width-to-height ratio, babyfaceness, and thin jaw contribute negatively to celebrity visual potential while sexual dimorphism, dark skin color, and large eyes contribute positively. In the mechanism step, we compare the interpretation results with extant theoretical relationships between facial features and celebrity visual potential, with personality traits as mediators. Contradicting theoretical predictions, we discover a negative correlation between averageness and celebrity visual potential. We demonstrate the generalizability of our results to media/entertainment and business domains. We also conduct experiments to compare our model-predicted scores with human-rated scores on celebrity-visual potential for further validation.

2 - Creating A Happy Employee: Impact of AI Adoption in Customer Service

Shunyuan Zhang, Harvard Business School, Boston, MA
Das Narayandas

Companies adopt Artificial Intelligence (AI) to improve the customers-CSAs (customer service agents) interactions. An emerging yet nascent research stream examines the impact of adopting AI on company sales and on customer satisfaction. Yet, the impact of AI on sentiment of the CSA remains unanswered. CSA sentiment plays a critical role in customer support function because 1) frontline CSAs influence customer loyalty, and 2) improved sentiment can reduce the employee turnover, which has big implications for any company. In particular, AI that augments CSAs induces AI-CSA interactions, and the final outcome of adopting an AI model hence relies not only the performance of AI, but how CSAs perceive, use, and interact with AI. To our knowledge, this research is the first to examine the role that AI plays in affecting CSA sentiment. We worked with a meal delivery company and designed a randomized controlled trial (RCT) where 30% of CSAs were randomly selected to use AI for six weeks, before AI became open to all CSAs. The CSAs served customers on three channels—Email, Phone, and Chat; the company adopted AI on Chat in 2021. The AI suggests replies that can be selected to respond to a customer message for CSAs to have real-time, back-and-forth conversations. We asked CSAs to rate their daily feelings from Very Unhappy to Very Happy. Exploiting the exogeneous variation in AI adoption, we find: 1) AI improved CSA's sentiment on Chat. Yet when same CSAs shifted on other channels (without AI), they were negatively affected by cross-channels spillovers, and 2) AI had a positive (negative) impact on making a CSA Happy (Very Happy). We reason that AI make CSAs' worker easier, while hurt their intrinsic passion. We found that AI was more effective in helping the inexperienced and/or underperforming CSAs. For companies in launching AI, in addition to the role of AI among users and places where AI is directly applied, interactions among contexts should also be considered. In addition to how AI might affect the direct sales and cost, companies should understand how their employee will perceive and react to an adoption of AI.

3 - Complementing Human Effort in Online Reviews: A Deep Learning Approach to Automatic Content Generation and Review Synthesis

Praveen K Kopalle, Dartmouth College, Hanover, NH
Keith Carlson, Allen Riddell, Dan Rockmore
Prasad Vana

Online product reviews are ubiquitous and helpful sources of information available to consumers for making purchase decisions. Consumers rely on both the quantitative aspects of reviews such as valence and volume as well as textual descriptions to learn about product quality and fit. In this paper we show how new achievements in natural language can provide an important assist for different kinds of review-related writing tasks. Working in the interesting context of wine reviews, we demonstrate that machines are capable of performing the critical marketing task of writing expert reviews directly from a fairly small amount of product attribute data (metadata). We conduct a kind of Turing Test to evaluate human response to our machine-written reviews and show strong support for the assertion that machines can write reviews that are indistinguishable from those written by experts. Rather than replacing the human review writer, we envision a workflow wherein machines take the metadata as inputs and generate a human readable review as a first draft of the review and thereby assist an expert reviewer in writing

their review. We next modify and apply our machine-writing technology to show how machines can be used to write a synthesis of a set of product reviews. For this last application we work in the context of beer reviews (for which there is a large set of available reviews for each of a large number of products) and produce machine-written review syntheses that do a good job - measured again through human evaluation - of capturing the ideas expressed in the reviews of any given beer. For each of these applications, we adapt the Transformer neural net architecture. The work herein is broadly applicable in marketing, particularly in the context of online reviews. We close with suggestions for additional applications of our model and approach as well as other directions for future research.

4 - Love Despite Flaws-impact of Algorithmic Decision Systems on Inventory Ordering Decisions

Yingda Lu, University of Illinois-Chicago, Chicago, IL
Xueming Luo, Liqiang Huang

Companies are increasingly adopting Algorithmic Decision Systems (ADS) to improve their business decision makings in recent years. In this paper, we examine the impact of ADS on inventory ordering decisions using field experiment. Given that managers often have private information that facilitates their decision making, we focus on the human-algorithm interactions in the use of ADS. We find that ADS generally increases the performance of inventory ordering decisions, and this effect is more salient for products with lower sales and higher uncertainties. We further hypothesize that providing ADS performance feedback information can improve the transparency of ADS, and consequently improve the inventory ordering decisions. Interestingly, while both providing positive and negative ADS performance feedback information can further improve inventory ordering decisions, providing negative ADS performance feedback information is more effective compared with providing positive information. This result also sheds light on the managerial implications of using ADS within corporations.

FB07

Virtual Room 07
Digital Economy I
Contributed Sessions
Chair: Carol Lu
Stanford University, Stanford, CA

1 - Digital Content and Customer Subscription Behavior

Daniel Guhl, Humboldt University Berlin, Berlin, Germany
Pradeep Chintagunta, Michaela Draganska

Many companies have now emerged publishing digital content, and they often rely on subscriptions to generate revenues. Because creating quality content is costly, the question arises of how much and what kind of content is needed to attract paying customers. Using data from an online adult entertainment platform, which produces and distributes video content organized in channels by genre, we construct three measures reflecting different aspects of the content available on a channel: amount, quality, and congruence (a measure that captures the similarity of videos within a channel). Unlike the mainstream movie industry, the release of videos on adult entertainment platforms is not driven by strategic considerations but rather a function of - somewhat unpredictable - factors driving production. We are thus able to build a model relating the impact of video content on the likelihood that a registered user of the site will convert to a paid subscription. Specifically, we formulate an individual-level subscription-timing model, where each registered user faces the competing risk of subscribing to a channel (or not) each week. We find that all three content measures affect subscription behavior positively. While this is expected for the amount and quality of content, the effect of congruence is new and seems to be dominant. These results are important for managers as well, as curating congruent content presumably costs less than producing more or higher-quality content.

2 - Measuring Fair Competition on Digital Platforms

Lukas Jürgensmeier, Goethe University Frankfurt, Frankfurt, Germany
Bernd Skiera

On digital platforms, platform actors such as sellers and buyers exchange goods, services, and information (offers). Platform providers support these exchanges by recommending specific offers on the platforms through rankings and labels. Often, however, the platform provider also serves as a platform actor. This dual role creates a potential conflict of interest: the platform provider could discriminate against third-party platform actors by recommending its offers more favorably than those from other platform actors. This presentation describes a novel approach to detect such discriminatory recommendations and applies it to the search engine on the Amazon Marketplace. Despite popular belief, our two studies covering more than a million daily observations from three countries hardly find discriminatory rankings through Amazon's search engine. Though best-selling products with Amazon holding the buy box are more visible than other sellers' buy box products, fair factors such as prices and ratings justify it. Furthermore,

Amazon Basics products are only half as visible organically as non-discriminatory rankings allowed. The presented approach enables platform actors, regulators, and lawmakers to test for discrimination on platforms. Applying this approach to the Amazon Marketplace challenges the notion that Amazon uses organic search results to discriminate against third parties.

3 - Welfare Impacts of Subscriptions for Digital Goods: The Case of Video Games

Carol Lu, Stanford University, Stanford, CA
Jacob LaRiviere

Offering content via bundle-based subscription services has become a prevalent business strategy for media platforms. Despite its popularity, there is limited empirical evidence on whether the subscription model could generate better outcomes for consumers compared to the traditional a la carte selling model. We answer this question using a novel proprietary dataset from the Xbox video game platform. We develop and estimate a model of demand and supply for individual games and the subscription service Game Pass. Applying the estimates, we find consumer surplus increases by 16% on average when Game Pass is introduced. The decomposition analysis shows that 47% of this surplus increase comes from the bundling aspect of the subscription service, and the rest comes from its renting aspect. We further simulate a scenario where consumers cannot purchase any games and can only access them through a subscription service. Consumer surplus decreases by 38% compared to the traditional selling model, with low-intensity and focused consumers being most affected. However, offering multiple tiers of subscriptions that cater to different segments of consumers could generate similar welfare outcomes as the selling model.

FB08

Virtual Room 08
Choice Modeling II
Contributed Sessions
Chair: I Hsuan Chiu
University of Wisconsin - Milwaukee, Milwaukee, WI, 53202,

1 - The Shift in Consumers' Brand Preference of Grocery Products from Major Brands to Private Labels: Evidence from a Dutch Retailer

Hao Chen, NielsenIQ, Chicago, IL
Alvin Lim

This research investigates the change in consumers' brand preference of essential grocery products before and during the COVID-19 pandemic. The increase in brand diversity in categories such as personal hygiene and cleaning products lead us to hypothesize a shift in consumers' brand preference from major national brands to private label and lesser-known brands. We conduct empirical data analyses of customer transactions from a Dutch grocery chain using a discrete choice model. Insights from the analyses, such as decrease in utility of major brands in certain categories, provide valuable theoretical and managerial implications for retail business practitioners, particularly in inventory planning and pricing strategy of national brand and private label products.

2 - Modeling Reference Dependence Effect and Regulatory Orientation

I Hsuan S Chiu, University of Wisconsin-Milwaukee, Milwaukee, WI
Gary J Russell

One major implication of the value function in prospect theory is loss aversion: losses loom larger than gains of the same size. The empirical examinations of loss aversion from consumer brand choice decisions, however, provide mixed results. For example, Bell and Lattin (2002) show that loss aversion is reduced or disappears when taking into account consumer heterogeneity. In this research, we show that regulatory focus theory can account for the heterogeneity in the reference dependent effect: consumers in a promotion-oriented mindset show a weaker response to loss aversion comparing to those in a prevention-oriented mindset. We consider a decision context where consumers rely on external reference points. To capture the reference dependence effect, we use the random regret minimization (RRM) model developed by Chorus (2012). The RRM model describes a decision process that compares attributes of an alternative to that of all other alternatives in the consideration set. RRM allows for flexibility in evaluating reference dependence effects across all attributes and alternatives, and provides a framework for incorporating regulatory orientations into the model specification. Using data from a choice experiment, we demonstrate that prospect theory describes the within-individual differences with respect to losses and gains, while regulatory focus theory describes the between-individual differences.

FB09

Virtual Room 09
Information Acquisition in Consumer Choice (Session II)
Special Sessions

Chair: Arash Laghaie
Goethe University Frankfurt, Frankfurt, Germany

1 - Incorporating Search and Sales Information in Demand Estimation

Olivia R Natan, University of California Berkeley Haas School of Business, Berkeley
Ali Hortacsu, Hayden Parsley, Timothy Schwieg, Kevin R Williams

We propose an approach to modeling and estimating discrete choice demand that allows for a large number of zero sale observations, rich unobserved heterogeneity, and endogenous prices. We do so by modeling small market sizes through Poisson arrivals. Each of these arriving consumers then solves a standard discrete choice problem. We present a Bayesian IV estimation approach that addresses sampling error in product shares and scales well to rich data environments. The data requirements are traditional market-level data and measures of consumer search intensity. After presenting simulation studies, we consider an empirical application of air travel demand where product-level sales are sparse. We find considerable variation in demand over time. Periods of peak demand feature both larger market sizes and consumers with higher willingness to pay. This amplifies cyclicality. However, observed frequent price and capacity adjustments offset some of this compounding effect.

2 - Multiattribute Search: Empirical Evidence and Information Design

Pedro Gardete, Nova School of Business and Economics, Carcavelos, Portugal
Megan Hunter

We investigate simple online behavior patterns that suggest the current dualistic view of simultaneous vs. sequential search modes is likely founded on coarse data. In contrast with the predictions of these search modes, we find consumers are selective about the attributes they inspect, they revisit items to acquire additional information, and often convert without collecting all data available on the selected alternative. Obtaining the correct demand structure is pertinent because the search literature has documented that consumer search modes can largely determine welfare allocations. We consider the full dynamic problem faced by consumers searching for used vehicles at an online car dealership and propose a feasible simulation-based estimator to characterize consumers' behaviors. We use the recovered fundamentals to analyze the consequences of different information provision activities - where a seller selects which attributes to feature and which to relegate. Sellers can do better than maximizing consumers' information by featuring characteristics that tend to pool bad news with ex-ante attractive alternatives, taking advantage of consumers unwillingness to search all data available. We find information provision tends to have modest impact on welfare, with the preferences of seller and consumers over information layouts often coinciding.

3 - Search Revisits: Evidence from the Lab

Ivy Dang, University of Hong Kong, Hong Kong, China
Raluca Ursu, Pradeep Chintagunta

Why do consumers revisit previously searched products before making a purchase decision? Based on findings documented in prior work, consumer may revisit for several different reasons—such as i) to gather additional information; ii) to compare similar products; iii) to gather information they previously obtained but have forgotten; iv) to eliminate an option from their consideration set; or v) because of a mistake. To directly test these different hypotheses, we designed and built a shopping website mimicking a typical online retailer's website: consumers sift through a list of ordered options, can click on a product to obtain additional information about it, and can choose one of the options to buy. We then used this website in a series of incentive-compatible experiments to collect information on how consumers search and what they buy. A new feature of our website is that it also allows researchers to ask consumers questions while they search. We used this feature to ask consumers why they revisit products and how they make their final purchase decision. With consumers' stated revisit reasons, as well as their search and purchase decisions, we try to uncover the mechanism behind search revisits. Additionally, by mapping search patterns under our observed revisit reasons with the types of search data obtained from observational studies, we provide insights into the benefits and limitations of the latter data for understanding search revisits. This also has implications for the required features of theoretical search models that may not entirely reflect the nuances of actual search and revisit behaviors of customers. Lastly, we derive managerial implications of search revisits for marketing mix decisions.

FB10

Virtual Room 10
Causal Effects and Policy Decisions II
Special Sessions
Chair: Sridhar Narayanan
Stanford University, Stanford, CA

1 - Does Carrying News Increase Non-news Views for Social Media Platforms?

Yu Song, University of Michigan, Ann Arbor, MI
Puneet Manchanda

With the rapid growth of online news aggregators, the debate on whether news aggregators should pay news publishers for redistributing their content has become very salient. However, there is little understanding of the impact of carrying news on news aggregators, especially for their non-news content. Our research fills this gap by examining the impact of news on non-news user engagement and content generation on Facebook. We leverage a natural experiment, Facebook's Australian news shutdown, to estimate this using both an event study and a difference-in-differences analysis. We find that both user engagement and content generation of non-news content on Facebook decreased after the news shutdown. We also find that these effects were more pronounced for more influential, socially active, experienced, and verified accounts. These results suggest positive spillover effects of news content on non-news content. A simple quantification exercise shows that the impact of carrying news is economically significant for a platform like Facebook. Our results provide timely and relevant implications for regulators and social media platforms.

2 - Does Emotional Matching Between Video Content and Advertising Lead to Better Ad Engagement? Evidence from a Large Scale Field Experiment

Anuj Kapoor, IIM Ahmedabad, Ahmedabad, India
Sridhar Narayanan

Video advertising platforms allow for a high degree of targeting of ads based on factors such as consumer demographics, their behaviors and the topics of the content on which the ad is shown. In this study, we examine the impact of matching the emotional content of ads with the content on which they are shown. Behavioral research has ambiguous predictions on the effect of such matching on ad engagement by the consumer and downstream actions such as clicks and purchases. On the one hand, matching has been found to lead to greater fluency on the part of the consumer and better persuasion, and this extend to matching on emotions as well. On the other hand, unmatched ads could lead to greater attention from the consumer due to emotional contrast. Thus, whether matching leads to greater or lower engagement is an empirical questions. We conduct a large-scale field experiment in collaboration with a video/ad serving platform. For a large set of users, we randomize the video and ad they are shown - specifically we classify a set of videos and ads as happy or sad, and randomize which combination of video and ad is shown to the consumer. This allows us to causally examine the impact of emotional matching of ads and video content in the field. Our main

finding is that unmatched ads lead to better engagement, but there is important heterogeneity in these effects. We next examine the mechanism questions and find support for the argument that such ads lead to greater attention and this in turn drives engagement by the consumers. Our findings are important extend our understanding of matching to the question of emotions, and are useful to firms thinking about how to target their ads.

3 - The Impact of Engagement with User-generated Content in Online Discussion Forums

Varad Deolankar, University of Michigan, Ann Arbor, MI
Ali Goli, S Sriram, Pradeep Chintagunta

Many online platforms that offer firm-generated content (FGC) for consumption also provide the space for creation and consumption of user-generated content (UGC), usually in the form of discussion forums. We study whether a user's engagement with UGC has an impact on their engagement with FGC. To this end, we use a novel dataset from Coursera, a popular online education platform, which has FGC in the form of lecture videos and supplementary readings and provides space for UGC consumption and creation via discussion threads about course materials. We use the exogenous variation in the forum home page as a shifter of a user's propensity to engage with UGC (i.e., the discussion forum). This allows us to identify the causal effect of that user's engagement with UGC on their engagement with FGC as well as their mastery of the content covered in that segment of the course. Our analysis suggests that, on average, a 10% increase in a student's UGC engagement increases that student's FGC engagement by 4.18% and performance by 0.34%. Therefore, our findings suggest that users tend to view UGC and FGC as complements. In the specific context of online education platforms, our results suggest that discussion forums can be used to bolster student engagement with course content as well as their learning.

4 - The Effects of Store Closure on Sales, Omnichannel Shopping, and Mobile App Usage

Taotao Ye, Texas A&M University, College Station, TX
Venkatesh Shankar

Many chain retailers periodically close some physical stores. A critical question for such retailers is: What is the effect of the closure of a store on the retailer's offline and online sales from shoppers in the neighborhood? Although prior research has examined the effect of new store openings, not much is known about the effect of store closures. The few studies that examine store closure focus on the aggregate impact of store closures and not on the causal effects of the closure of

a particular store. Moreover, many retailers have mobile apps that customers use to shop. An important related question for retailers with a mobile app is: How does the closure of a store affect the neighborhood shoppers' mobile app usage and purchases online and offline? We address these questions using shopper transaction and mobile app usage data from a large retailer who closed 34 stores in a month. We estimate the causal effects of store closure through the difference-in-differences approach by creating propensity score matched control stores and by controlling for selection. We analyze the effects at both the county aggregate and county shopper levels. Our results show that the retailer loses significant net monthly sales of $182,538 (more than the average monthly sales of the closed store) in the county with the closed store due to spillover effects on the retailer's other customers in that county. The numbers of active customers, new customers, new app users, and mobile app engagement also decrease after store closure. Online sales go down in the 3-15 months window after closure but recover in the long run. Retailers can mitigate the negative effects by choosing counties with low in-store discounts, fast high-speed mobile connectivity, and high level of online sales to close. They can migrate shoppers in counties facing store closure to shop online and through the mobile app by enrolling them in their loyalty program, offering online discounts, and promoting product information and purchase features in the mobile app.

FB11

Virtual Room 11
Marketing Strategy and Firm Performance I
Contributed Sessions
Chair: Mitsukuni Nishida
Johns Hopkins Carey Business School, Baltimore, MD

1 - The Defining Facets of Customer Centric Leadership: An Exploration of How CEOs and Senior Executives Lead Market-oriented Organizations
Chris L Brown, CEO, Pepperdine University, Malibu, CA
An extensive body of research has documented the positive outcomes of market-oriented culture on customer satisfaction, employee engagement, and financial returns for shareholders. In contrast, little research has explored the role of leaders, specifically CEOs, in fostering a market-oriented culture. Through an analysis of interview data from 66 CEOs across a variety of market-oriented firms, the research seeks to identify the defining characteristics of market-oriented leaders. The interviews provide insights into how they developed their market-oriented approach and

identify the behaviors they engage in to create and sustain a market-oriented organizational culture. From a theoretical perspective, emerging findings signal the importance and relevance of construal theory and narratives in how leaders can translate and communicate the abstract notion of market orientation into more concrete and actionable practices. One emerging finding is the use of the customer as a concrete unifying theme to bring all people in an organization together around a common purpose. Through the lenses of construal theory and narrative theory, we explain how market-oriented leaders continually transform their businesses by inspiring employees to act in a market-oriented way with customers as the central driving motivational force. Additionally, several archetypes of market-oriented leadership emerged as a function of a leader's primary influencing approach and as a function of the lifecycle of their organization. Some market-oriented leaders shape their organizations via interpersonal relationships whereas others rely on setting and communicating a customer-centric vision. The ways in which leaders develop and sustain customer-centricity also varies as a function of whether they are creating a business (founder) or transforming it (professional manager). This research offers guidance for CEOs who want to achieve high levels of market orientation in their businesses.

2 - Does Strategy-Customer Alignment Payoff?
Narendra K Bosukonda, Doctoral Student, Texas A&M University, College Station, TX
Shrihari Sridhar, Vikas Mittal, Sonam Singh
Popular press is replete with the prescription that a company's strategy should be aligned with its customers to help deliver superior financial performance. Yet, extant literature lacks 1) an objective measure of strategy-customer alignment 2) empirical research linking strategy-customer alignment and objective financial performance 3) an understanding of how strategy-customer alignment affects senior executives' attitudes and behaviors. Our research addresses these gaps in literature. To measure the alignment between a company's business strategy and its customers we introduce the multidimensional construct of strategy-customer alignment. We conduct two empirical studies. In Study 1, using data from 17,251 customer surveys of 127 companies, and employing a machine learning approach, we measure strategy-customer alignment at the company-year level and show that alignment is positively associated with revenues, profits and negatively associated with costs. A 1% increase in strategy-customer alignment can increase revenues by 2.3%, reduce cost of selling by 1.8% and increase gross profits by 1.5%. In Study 2, we collected 1,122 survey responses from customers and 745 survey responses from senior executives to measure strategy-customer alignment at employee level. We find that as strategy-customer alignment increases, coordination costs

among senior executives decrease, the use of accountability metrics increase, and this leads to increase in the senior executives' perceived strategy effectiveness.

3 - Drivers and the Financial Consequence of Digital Transformation

Chun-Yao Huang, National Taiwan University, Taipei, Taiwan
Yen-Chun Chen, Ping-Yu Liu

Digital transformation has been a critical challenge to market players during the past few years. Facing changes in technological environment, which factors determine the success of a firm's digital transformation is an important but understudied question. In this study, we look at how a firm's strategic orientations (customer orientations and entrepreneurial orientation) influence its degree of digital transformation through the mediation of its environmental sensing capability, and investigate the impact of a firm's degree of digital transformation on its financial performance. A set of hypotheses are first proposed. Resorting to the technique of computer aided text analysis (CATA) to measure constructs of concern from the MD&A components of annual reports, we conduct a large-scale empirical study on publicly-listed firms to validate the set of hypotheses. A comparison is also made between firms listed in the States and those in China. As such, we empirically validate that a firm's strategic orientations influence its capability of environment sensing, which in turn influences its degree of digital transformation. Furthermore, we partially demonstrate that digital transformation would contribute to a firm's financial performance as measured by ROA growth.

4 - Brand Share and Long-lasting Effect of Capital Relationship: The Case of Japanese Supermarket and Convenience-store Chains

Mitsukuni Nishida, Johns Hopkins Carey Business School, Baltimore, MD

Although there is a large body of literature on the market share dominance of first-mover firms, less is known about the effect of their shareholder companies' entry behavior on the entry and performance of their subsidiaries. This paper documents how shareholder companies affect entry behavior and firm performance of subsidiaries in related but different industries. I leverage a panel of store counts and entry order by the geographic market for Japanese supermarkets and convenience stores from 1945 to 2013. I document two empirical patterns. First, in geographic markets where their parent companies (mainly supermarket chains) have developed in the past, convenience-store chains tend to enter earlier than their competitors. Second, controlling for

the entry order of convenience-store chains, a convenience-store chain's market share tends to be higher when its parent company enters the market earlier than its competitors.

FB12

Virtual Room 12
Consumer Behavior: Preferences and Perceptions
Contributed Sessions
Chair: Sakshi Sanjay Babar
University of Georgia, Athens, GA

1 - Voice Tone as a Driver of Smart Agent Anthropomorphism: Process Paths and Persuasion Consequences

Yegyu Han, IE Business School, Madrid, Spain
yegyu.han@ie.edu
Dipankar Chakravarti

Consumers often anthropomorphize non-human objects including robots and smart AI devices like Amazon's Alexa. Humanoid features, facial expressions. and natural language processing capabilities facilitate such anthropomorphosis imbuing a machine with distinctive, human-like psychological responses (e.g., motivations, emotions, and cognitions) that imply intentionality. A smart agent's voice and voice tone can also evoke anthropomorphism with corresponding attribution of personality features, autonomy and trustworthiness to the machine. However, the specific pathways along which such effects occur as well as their persuasion consequences are not well understood. Prior research shows that voice tones with a higher average pitch and delivered at faster speeds signal emotionality in interpersonal communication. We examine whether a similar attribution would occur naturally (i.e., replicate) for smart agents (e.g., Amazon Alexa, Google Home). In an experiment with a between-subject design, we show that higher pitch and greater delivery speed not only generate perceptions of emotionality, but also facilitate anthropomorphism. As expected, the anthropomorphic attributions for an emotional versus a rational voice are differentially rooted in affective (warmth and sociability) versus cognitive (competence and intelligence) perceptions. Furthermore, we find that the voice tone effect translates to a higher consumer motivation to engage in consequential communal behaviors that are mediated by affective anthropomorphism.

2 - Individual Differences in Quality-Quantity Tradeoffs in Consumption: Conceptualization, Scale Development, and Validation

Rodrigo S Dias, PhD Candidate, Duke University,

Durham, NC

Eesha Sharma, Gavan Fitzsimons

Consumers often face tradeoffs between quality and quantity when making purchasing decisions. In the current work, we find that there are systematic individual differences in quality-quantity tradeoffs in consumption, over and above differences across contexts. Some consumers systematically prefer quality (vs. quantity), and some systematically prefer quantity (vs. quality). Using various samples (N = 2,226), we first develop and validate a domain-free scale to measure individual differences in quality-quantity preferences in consumption—the quality-quantity tradeoffs scale. We find that the scale is internally consistent and temporally stable. We then examine revealed preferences for quality vs. quantity by looking at choice of (n = 465) and willingness to pay for (n = 469) higher-quality and higher-quantity purchases. Using multilevel modeling, we find that consumers exhibit consistent preferences for quality or quantity across consumption domains; this variation is significantly predicted by the quality-quantity tradeoffs scale. Next, we examine how quality-quantity preferences relate to various constructs in 4 studies (N = 1,985). The quality-quantity tradeoffs scale is empirically distinct from but related to constructs capturing consumers' disposition towards buying more (e.g., greed, compulsive buying). Finally, quality-quantity preferences predict consumers' reactions to quantity promotions (n = 1,000) and spending (n = 983). Consumers with higher preference for quantity (vs. quality) report higher purchase intention for items under quantity promotions and spend more money overall. The current work contributes to marketing theory and practice by introducing a new construct, and offers insights to managers by showing how it predicts meaningful consumer behaviors.

3 - Designing Social Robots as Human Companions: Does One Size Fit All?

Iqbal U Ahmed, Virginia Tech, Blacksburg, VA
Dipankar Chakravarti

Loneliness and social exclusion are major contemporary social problems (Cacioppo and Patrick 2008) and reflect a gap between an individual's desired nature and quality of social connections and the relationships actually in place. A rich literature addresses the serious physical/mental health impacts of loneliness, as well as prevention and coping interventions.

Research in social robotics is bringing us closer to reality in which we partner with physically embodied agents with autonomy and interaction capability (Henschel, et al., 2020). In the consumer domain, Mourey et al. (2017) find that engaging with anthropomorphic products may mitigate social exclusion effects. Plausibly, human-robot interactions may also help mitigate loneliness through interactions with social robots with aligned personalities.Such personality alignments pose a key design challenge since not all consumers may wish to interact with social robots in the same way when lonely. For some, loneliness stems from social exclusion, whereas others may actually prefer to limit social contact (i.e., social excluders). The companionship preferences of social excluder and socially excluded consumers may differ. Thus, the former may prefer interactions that are largely cognitive-deliberative and resist emotional investment.We develop and test a set of measurement instruments to distinguish social excluders and socially excluded consumers. We find that although social excluders mirror some opponent traits to those socially excluded, they also feature other traits that differ on unrelated dimensions. We compare our instruments to other inventories (e.g., Myer-Briggs) and discuss their use in designing social robots that more effectively match the user's companionship preferences and service needs.

4 - Climate Labeling Policy and Consumer Choice

Sakshi Babar, University of Georgia, Athens, GA
Youngtak M. Kim, Sundar G Bharadwaj

With the growing concern about climate change and its consequences for societal well-being, countries and firms are involved in climate actions aimed at reducing the carbon footprint. Firms appear to be following a two pronged strategy of reducing resource use in their manufacturing and distribution of products and at the same time, encouraging consumers to make choices that reduce the carbon footprint. While still in early stages some firms are incorporating carbon footprint information in their product labels. Surveys of consumers indicate that over 50% pay attention to information on the CO_2 emissions of products, especially in the cases of food and cosmetics. However, academic research on whether consumers respond to these labels is limited. This study presents results of choice based conjoint studies that examine the effect of carbon footprint information and labeling regimes on products consumers choose. We also examine the moderating role of consumer knowledge and orientation towards environmental issues. The results have implications for firm marketing strategy and regulatory guidelines on product labels.

FB13

Virtual Room 13
Online Reviews
Special Sessions
Chair: Meng Liu
Washington U. in St. Louis, St. Louis,IL
Co-Chair: Xiang Hui

Washington University in St. Louis, Saint Louis, MO

1 - Incentivized Reviews

Sungsik Park, University of South Carolina, Columbia, SC
Woochoel Shin, Jinhong Xie

Firms often provide financial incentives to motivate consumers to post reviews of their products. Despite the popularity of so-called incentivized reviews (IRs), little is known about the consequences of this practice. This paper investigates IRs from the perspectives of important market stakeholders: firms, consumers, and policy makers (or platforms). First, using an Amazon policy change from condoning to prohibiting IRs as our empirical context, we find a positive sales effect of IRs, which suggests that IRs are an effective marketing investment for firms. Second, our analysis reveals that (a) IRs have inflated ratings and richer content relative to organic reviews and (b) removing IRs is associated with higher post-purchase product evaluations by consumers, suggesting that IRs increase the risk that consumers will make a suboptimal decision. We also find that IRs are more likely to be posted to mid-quality than high- or low-quality products, suggesting that consumers should be particularly cautious when buying mid-quality products to protect themselves from being misled by IRs. Finally, based on incentive compatibility, we develop conjectures regarding how a platform-initiated IR system could be more socially desirable (e.g., with uninflated rating) than a firm-initiated one. We empirically validate these conjectures using Amazon's Vine program. We discuss implications of these findings for firms, platforms, and policymakers.

2 - Do Incentives to Review Help the Market?

Dave Holtz, UC Berkeley, Berkeley, CA
Andrey Fradkin

Online reviews are typically written by volunteers and, consequently, accurate information about seller quality may be underprovided. We study the extent of this under-provision in a randomized experiment conducted by Airbnb. In the treatment, buyers are offered a coupon to review listings that have no prior reviews. The treatment induces additional reviews, which are more negative on average. Induced reviews do not change nights sold, although they affect the types of transactions that occur. Measures of transaction quality for treated sellers do not improve. We show how market conditions and the design of the reputation system can explain our findings.

3 - Words Meet Photos: When and Why Visual Content Increases Review Helpfulness

Gizem Ceylan, University of Southern California, Los Angeles, CA

Kristin Diehl, Davide Proserpio

Is visual-verbal word-of-mouth more persuasive? If so, do consumers find communication more helpful when photos and text convey similar or different information? This paper examines the effect of photo-text similarity on review helpfulness and its underlying drivers. Using a dataset of 6.8M reviews including 3.3M photos from Yelp and applying state-of-the-art machine learning algorithms, we quantify the similarity of the content between text and photos. We find that it is not only the mere presence of a photo that increases helpfulness but also the similarity between the photo content and the review text. We replicate our main findings and examine the underlying drivers in two laboratory experiments. When the photos and text convey similar (vs. dissimilar) information, consumers find the review more helpful because 1) the information in the review becomes easier to process, and 2) quality inferences of the focal attribute are heightened. However, greater similarity 3) limits the total amount of information conveyed, reducing helpfulness. We find that drivers (1) and (2) outweigh (3). Therefore, the totality of these three distinct processes allows greater photo-text similarity to heighten persuasion. These findings provide novel insights into the persuasiveness of visual-verbal word-of-mouth and its underlying psychological drivers.

4 - Designing Quality Certificates: Insights from Ebay

Meng Liu, Washington U. in St. Louis, St. Louis, MO
Xiang Hui, Zhe Jin

Quality certification is a common tool to reduce asymmetric information and enhance trust in marketplaces. Should the certificate focus on seller inputs such as fast shipping, or include output measures such as consumer ratings? In theory, incorporating output measures makes the certificate more relevant for consumer experience, but doing so may discourage seller effort because outputs can be driven by random factors out of seller control. To understand this tradeoff, we study a major redesign of eBay's Top Rated Seller (eTRS) program in 2016, which removed most consumer reports from the eTRS criteria and added direct measures of seller inputs. This change generates immediate selection on certified sellers, and homogenizes the share of certified sellers across product categories of different criticalness in consumer ratings. Post the regime change, sellers improve in the input measures highlighted in the new certificate. These effects are more conspicuous in categories that had less critical consumer ratings, in part because the new algorithm automatically removes the potential negative bias for sellers in critical markets and a clearer threshold motivates sellers to just reach the threshold. The new regime also makes sales more concentrated towards large sellers, especially in the categories that face more critical consumers.

FB14

Virtual Room 14
Unstructured Data and Marketing II
Special Sessions
Co-Chair: Oded Netzer
Columbia University, New York, NY
Chair: Shunyuan Zhang
Harvard Business School, Boston, MA

1 - Telling a Coherent Story: The Importance of Image-text Coherence in Digital Advertising
Jochen Hartmann, University of Groningen, Groningen, Netherlands
Display advertising often includes an image and a textual tagline that individually and jointly are aimed at conveying information and enticing consumers to buy. In this research, we explore how each one of these communication modes affect consumers' reaction to the ad. Specifically, we explore how the image-text coherence drives ad effectiveness. To operationalize coherence, we formulate an iterative masked language modeling problem to assess the fit of the concepts in the image in the context of the text. This measure exploits the sequential nature of human language as well as the contextual meaning of words. We explore our novel measure in conjunction with alternative embedding-based image-text similarity measures to study the multi-faceted interaction between ads and taglines.We collaborate with a display ad platform, leveraging a large-scale multi-modal dataset, including tens of thousands of cross-category digital ads and consumers' reactions to these ads in terms of click-through rates (CTRs), one of online marketing's core outcome variables. A unique aspect of our dataset is that it often provides a quasi-experimental setting to study text-image coherence with the same image appearing with different taglines and the same tagline appearing with multiple ads. Controlling for a host of visual and textual characteristics of the ads (e.g., complexity, abstraction, emotion), we find an inverted-U relationship between coherence and CTR. Our results suggest that advertisers and scholars are well-advised to assess images and texts together rather than individually. Methodologically, we build on the language modelling literature to develop a novel measure of image-text coherence, which captures a unique image-text relationship, above and beyond their mere similarity.

2 - Automatically Discovering Unknown Product Attributes Impacting Consumer Preferences
Ankit Sisodia, Yale University, New Haven, CT
Alex Burnap, Vineet Kumar

Marketing models typically focus on understanding how structured product attributes impact consumer preferences. However, obtaining attributes present in unstructured data (e.g. text or images), although important, rely on human (expert) judgment. Our research building on recent advances in disentangled representations (with statistical independence and semantic meaning) in deep learning aims to discover such attributes from unstructured data automatically, without human intervention. The recent deep learning literature has emphasized supervision of the discovered attributes on ground truth, as unsupervised approaches are not theoretically guaranteed to discover unique disentangled representations. Our approach does not require ground truth on the visual attributes, which is assumed in most of the literature. We instead use readily available structured product attributes as supervisory signals and identify which signals work best. Our approach is practically useful since we do not need to specify the number of attributes or their meaning, yet we discover semantically interpretable and statistically independent attributes. We apply this approach to automatically discover visual product attributes of high-end watches auctioned at Christie's and discover 6 semantically interpretable visual attributes providing a disentangled representation. We find that supervisory signals such as `brand' promote disentanglement relative to the unsupervised approach, but surprisingly `price' does not.

3 - Transfer Learning for Personalized Marketing Promotions
Artem Timoshenko, Northwestern University, Evanston, IL
Marat Ibragimov, Duncan I Simester, Jonathan Parker, Antoinette Schoar
Targeting policies are typically trained using data from field experiments. For example, a luxury fashion retailer can decide which customers should receive a coupon for the Valentine's Day event using experimental data from a similar campaign implemented in the previous year. We demonstrate that firms can substantially improve targeting policies by augmenting the focal experiment with information from other marketing campaigns, even though the source campaigns may involve different marketing actions and different types of customers.

4 - Comparing Automated Image Classification Methods
Keno Tetzlaff, University of Hamburg, Hamburg, Germany
Jochen Hartmann, Mark Heitmann
The relevance of visual content for marketing research and practice is rapidly increasing. However, the plethora and novelty of methods (both open-source and proprietary black-box methods) makes it challenging for researchers to understand how these perform for actual research

applications. This research intends to guide researchers in choosing the best image classification method. We conduct more than 3,000 experiments using 30 datasets with different application contexts and compare all convolutional neural network architecture families on Keras. Mean method performance varies between 37.0% and 58.2% accuracy suggesting performance depends on both method choice and application context. We conduct multiple regression analyses with accuracy as the dependent variable and method, training hyperparameters as well as dataset characteristics and image pre-processing as independent variables, to investigate the reasons for these differences. Among individual architectures, VGG-16, which is popular in marketing research, performs significantly worse than EfficientNetB0 (+5pp, p<.001) or DenseNet121 (+4pp, p<0.05). Our results suggest marketing researchers can benefit from fine-tuning (+3pp, p<.001) and should consider a pre-selected set of as little as three candidate models to achieve top performance on >90% of our datasets.We also evaluate commercial black-box solutions and find they do not generate a systematic advantage in terms of classification accuracy. In most cases open-source software performs similarly or better, suggesting researchers will rarely have to rely on commercial software.

Friday, 11:30am–12:30pm

FC02

Virtual Room 02
Product Information and Diffusion
Contributed Sessions
Chair: Daniel Kebede
Purdue University, West lafayette, IN

1 - Product Innovation Through the Perspective of Design-driven Ecosystem

Jesheng Huang, Chung Yuan Christian University, Taoyuan City, Taiwan

Based on the perspective of design-driven ecosystem (DDE) constructed by Huang (2021), this article further explores the types and mechanism of product innovation within this kind of ecosystem, combining the theories of user innovation and user innovators. Derived from the literature review and research findings, DDE is defined as the alignment structure of the multilateral set of entities interacted by their design interdependence in order to provide design-related products with focal value proposition to their common customers, enabled by modularity, not hierarchically managed, which implies the product innovations can be inspired or facilitated by the related design activity flows among the firms within DDE. Through examining the structures of DDE from three cases—handbook, selfie, and Graffiti, the research finds that, within DDE, (1) he members' series of out-input combinations in design activity flows provide the key idea sources of product innovation, and most of them facilitates incremental innovations; (2)as customers playing a critical role of value cocreation, most of user innovations are completed by consumers' sharing their new product idea in the social media platforms, and the type of product innovations vary on materials, new uses, and complementarities with other design among members; (3) user innovators often create new meaning on current product, which can extend or enrich the original value proposition and then bring product conceptual innovations;. Finally, future research agenda has been suggested as well.

2 - The Impact of Source and Content Attributes of New Product Information Leakages on Firm Value

Mahdi Niknejad, University of Texas At Austin, Austin, TX
Vijay Mahajan

New Product information leakages (NPLs) have become more common in recent years, forcing firms to put vast resources into security practices. However, little is known about the impact of these leakages on firm value. This study is an examination of stock market reactions to new product leakages in high-tech consumer markets. The authors also consider the moderating roles of leaker characteristics and leakage content. The results suggest that on average, investors react positively to new product leakages. The abnormal returns are greater when there are more leakers publishing NPLs, resulting in diffusion of more information about the firm's R&D activities. Moreover, the number of trustworthy leakers positively influences abnormal returns. Leakers who are of higher status or those with whom the investors are more familiar generate more positive response in the stock market as well. In addition, the characteristics of leakage content influence firm value. Abnormal returns are higher when there is supporting evidence in the content. Conversely, presence of brand innovation in the content negatively affect the abnormal returns associated with new product leakages. These findings offer novel insights into new product leakages and announcements for researchers and managers alike.

3 - Mobile Money Penetration in Low Income Countries: The Mediation Effect of Latent Demand and Micro-entrepreneurial Climate

Marzieh Yaghini, University of Guelph, Toronto, ON, Canada

, Towhidul Islam, Asish Sood

Mobile money, an inclusive innovation, provides a wide variety of benefits to consumers, businesses, and governments, thus a deeper understanding of why market penetrations in low-income countries are higher for such inclusive innovation can yield significant benefits. We explore the multiple mediation role of latent demand and micro-entrepreneurial climate contributing to mobile money market penetration. This analysis indicates underdeveloped financial infrastructure, unmet demand, and informal microentrepreneurial environment as reasons driving higher mobile money penetration in low-income compared to higher-income economic regions. Our dataset encompasses several multinational databases including mobile money market penetration in 77 countries from all economic regions. We use a counterfactual approach to establish causal multiple mediation analysis to empirically test our two hypotheses. We establish the negative mediation effect of latent demand and the positive mediation effect of micro-entrepreneurial climate, on mobile money market penetration in low-income relative to high-income economic regions. We contribute to both theory and practice by providing a deeper understanding of the penetration of inclusive innovations.

4 - Leveraging Promotions for Social Good: Insights from COVID-19 Vaccine Distribution
Daniel Gulti Kebede, PhD student, Purdue University, West Lafayette, IN
James Reeder
Governmental agencies and non-governmental organizations have often relied on marketing techniques to drive compliance of their constituency. For example, the US government has recently pledged to spend $50 million in advertising to promote the HealthCare.gov website. Our study explores a different marketing tool used in public policy that has not been studied, promotions. While promotions, both price and non-price promotions, have long been used by businesses to drive sales, this is a relatively new lever used in public policy at such a scale. During the COVID-19 pandemic, local governmental agencies were forced to grapple with how to increase vaccination rates among the population. Our study is the first to examine if the use of promotions increased the rates of vaccinations within the . Using a novel set of data, recasting the bass diffusion framework, and leveraging new techniques to assess treatment effects in panel data we estimate not only the direct effect of promotions on vaccination, but if regional heterogeneity plays a role in its efficacy. Our preliminary findings suggest that the use of promotions does increase the rate at which people get vaccinated. However, this effect is moderated by the size of the population that is vaccine hesitant and political affiliation.

FC03

Virtual Room 03
Influencer Marketing VII
Special Sessions
Chair: Andreas Lanz
HEC Paris, Paris, France
Co-Chair: Yaniv Dover
The Jerusalem School of Business Administration, Jerusalem, Israel

1 - Untactful Social Media Messages: Consequences and Mitigation Strategies
Sourindra Banerjee, University of Leeds, Leeds, United Kingdom
Abhishek Borah, Andreas Eisingerich, Yu-Ting Lin
The positive effects of firms' active presence and participation in social media has been widely studied in marketing. However, important questions remain about the impact and characteristics of a firm's self-induced social media crisis that can drive negative sentiment and how the repercussions of such crisis can be mitigated effectively. Specifically, we address this gap in the literature, by theorizing about the phenomenon of untactful social media messages (USMM) and identifying the key characteristics of such messages namely, sloppiness, incongruence, and dissonance. Furthermore, we demonstrate the relationship between the key characteristics of USMM and its damaging effects on abnormal stock returns and point to potential mitigating factors that can help alleviate the negative effects of a firm's USMM. Specifically, our findings show that incongruent messages trigger not only negative sentiment but also generate negative abnormal returns. While dissonant messages increase negative sentiment, sloppy messages decrease abnormal stock returns. We also show that deletion of the USMM is the simplest and yet most powerful action of mitigation that firms can take to alleviate the harmful impact of USMM. Apologizing and a concurrent strategy of both deletion and apology does not mitigate the tide of negative sentiment sparked off by a USMM.

2 - The Role of Community Shared Purpose in Online Community Dynamics
Yaniv Dover, The Jerusalem School of Business Administration, Jerusalem, Israel
Martina Pocchiari
The importance of online communities to marketers has been demonstrated in the literature, yet there is limited large-scale empirical evidence that can provide insight into what makes some online communities successful, while others

are not. Here, we study the role of a fundamental aspect of online community success: the shared purpose around which the community is formed. Even though the shared purpose of communities is the core reason that communities exist and thrive, there is little empirical evidence to support and quantify its role in real-life settings. In this study, we leverage pseudo-experimental conditions in the context of sports fan communities to investigate how shocks to a community's purpose affect community dynamics. Using a difference-in-difference framework, we find that negative-vs-positive shocks decrease activity and engagement in online communities, and that the effect of negative shocks is absorbed differentially across community members. In particular, negative shocks mainly impede the activity of the community's core -- the most highly connected, active, and central community members. This pattern of results is also reflected in the post-shock changes to the social network structures of the affected communities. Negative shocks induce members to interact with fewer peers, and within smaller social cliques. In other words, the networks become more centralized and localized after a negative shock. In terms of user-generated content, we find that negative-vs-positive shocks also reduce the energy level in the discussion - measured through the magnitude of arousal in community discussions - and impede expressions of group affiliation. Finally, in a series of heterogeneity and subgroup analyses, we find that the baseline effects are sensitive to the prior expectations of the community members. In particular, the more unexpected the negative shocks are, the stronger the disruption that occurs to the activity and functioning of online communities. We discuss the managerial implications of our findings to marketers in the context of online communities.

FC04

Virtual Room 04
Retailing II
Contributed Sessions
Chair: Anna Ulrichshofer
Technische Hochschule Ingolstadt,
Ingolstadt, Germany

1 - Impact of 'Buy Now Pay Later' on Consumer Purchases

Stijn Maesen, Imperial College Business School, London, United Kingdom
Dionysius Ang

'Buy Now Pay Later' (BNPL) is a payment method that allows consumers to pay in instalments and has become popular among retailers and consumers. However, little is known about the influence of BNPL on consumer purchases. This research provides insights on the impact of BNPL on consumer purchases by leveraging data on the introduction of BNPL as a payment method by a large U.S. retailer. The introduction of the BNPL payment method allowed consumers to purchase products immediately and pay with four equal repayments. We exploit that after the retailer made BNPL available to its customers, only a selection of customers adopted the service. To mitigate possible bias due to self-selection of BNPL adoption, we use matching on observable factors to increase the comparability of adopters and non-adopters of BNPL. The results of a difference-in-difference analysis show that adopters of BNPL spend significantly more than non-adopters in the period after the introduction of BNPL. We also explore heterogeneity in this effect between customers and across time, and further discuss the implications of our findings.

2 - The Impact of Co-location of Departments on Joint Sales in Retail Stores

Laxminarayana Yashaswy Akella, Indian Institute of Management Ahmedabad, Ahmedabad, India
Praveen K Kopalle, Dhruv Grewal, Jens Nordfält

Retail stores have finite space in which they decide the arrangements of departments. Relying on store layouts and sales data from a retailer across ten stores, this research presents the importance of considering co-location on joint sales. Certain vital factors such as location, the total area of the departments and the store, type of departments (substitutes, complementary, and neutral), and department layout have been considered for a micro understanding of the store. Results show that the co-location of two departments has an 'inverted-U' relationship with joint sales. This paper finds that in the type of departments, the complementary departments need not be arranged just beside each other but away so that the departments in the store overall appear complementary. In contrast, substitutes of a department have to be placed at the exact location and cannot be dispersed through the store. This would allow customers to compare the products with their peers without moving much. For neutral departments (i.e., where the departments are unrelated), they can be placed at sufficient distances to each other to avoid distraction with the basket items. In additional insight, this paper finds that implementing different layouts for different departments significantly improve sales over having the same format for each department (the layouts of the individual departments must differ from each other).

3 - How do Returns Impact Future Sales? Theory and Evidence

Boram Lim, University of Kansas, Lawrence, KS

, **Kissan Joseph, Ram Janakiraman, Lauren Min**
Academic research has established the role of the option to return products in reducing consumers' perception of risk in product buying. In this study, we investigate an unexplored, but important, question related to product returns: how does product returns incidence impact future buying behavior? We propose a conceptual model that delineates two distinct mechanisms by which return incidence can affect future sales. Return incidence makes the option to return products salient in the customer's mind and increases the perceived utility of the retailer's offering set, which then increases customer's future spending. Return incidence also engenders customer gratitude, which in turn generates greater patronage with the retailer. We refer to these as salience and utilization and gratitude and reciprocation effects of product returns respectively. To test our hypotheses, we adopt a multi-method approach, one which leverages a panel dataset of 1727 offline grocery shoppers and laboratory data and difference-in-differences models. We offer important implications for theory and practice on the effect of customers' decision to return products on their subsequent purchase behavior.

4 - Patterns of In-store Behavior and its Implications on Customers' Shopping Baskets
Anna Ulrichshofer, Technische Hochschule Ingolstadt, Ingolstadt, Germany
Michael Jungbluth
The path through a website (clickstream) a customer takes during online shopping is well and frequently analyzed in the literature due to the easy availability of such data (e.g. Montgomery et al., 2004). The insights from this literature help to understand customers' choices and to design interventions to improve experiential value and conversion rates. To take this analysis and methods to the stationary Point-of-Sale (PoS) two main obstacles must be overcome: First, obtaining the data on offline paths in a given store is rather difficult. Second, offline paths are subject to spatial constraints, which often change from store to store. Adding to the in-store literature (e.g. Larson et al., 2005; Sorensen et al., 2017) we have access to granular data on customers' paths within a non-grocery store on the individual customer level. The data does neither rely on paths being tracked via RFID tags on shopping carts nor customers carrying a mobile phone with a specific app. Instead, 360 degree tracking sensors on the ceiling continuously convert movement into anonymous time-stamped location data. We complement our offline path data with information on customers' shopping baskets to quantify economic outcomes. Similar to the abandoned shopping cart in eCommerce, the role of paths taken on the conversion rates is investigated. We set-up a theoretical model considering customers' paths as a sequence of conditional decisions taken between available category

options. The observed movements are a transformation of underlying latent states given the store layout. This makes the results applicable to other store designs. The analysis of pooled offline path data across heterogeneous store layouts is imperative for brick-and-mortar retailers to effectively leverage insights throughout the entire retail chain.

FC05

Virtual Room 05
Data Driven Marketing 1
Special Sessions
Chair: Daria Dzyabura
New Economic School, Moscow, Russian Federation
Co-Chair: Simha Mummalaneni
University of Washington, Seattle, WA

1 - Adaptive Experimentation for Pricing for Random Utility Model
Lalit Jain, University of Washington, Seattle, WA
Hema Yoganarasimhan
We consider the problem of setting the optimal prices and marketing mix variables for a large number of products. At each time a customer arrives and chooses a product based on a multinomial discrete choice model with utilities depending on the prices of the products, and the marketing allocation. Using a Thompson Sampling approach, we develop a regret minimizing, alternatively profit maximizing, algorithm for the seller. Our work is the first practical approach for dynamic pricing for the discrete choice model that allows for a continuous set of potential price vectors. In addition, our model of marketing allocation provides a new model for assortment selection problems. Using both synthetic simulations, and simulations based on real-life grocery store data, we show that our method significantly outperforms existing approaches. We also provide theoretical justification of our result and improve upon existing regret guarantees.

2 - Semantic Properties of Writing Predict Academic Success
Olivier Toubia, Columbia Business School, New York, NY
Jonah Berger
What does writing reveal about the writer? We suggest that the semantic properties of writing samples can predict academic success. Using 25,000 student essays from a large public university, we find that even controlling for a variety of relevant factors (i.e., SAT scores and parent education) semantic progression predicts GPA. Our results are particularly surprising given that we focus on students who were already admitted and enrolled, at which point

college admissions essays have no direct relation to success. We argue that written output reflects the author's associative abilities, which have been shown to be related to their creative abilities, which in turn have been shown to be related to academic success. We find that the most successful students tend to write essays that cover a lot of ground (as measured by the volume occupied by the essay in a latent semantic space) without moving too fast (as measured by the speed with which the essay moves in the latent semantic space). We argue that the ability to cover a lot of ground reflects the student's dissociative ability (the ability to access mutually remote associative elements) and that the ability to do so without excessive movement in the latent semantic space reflects associative ability (the ability to combine remote concepts in an adequate way). The combination of dissociate and associative ability has been shown to predict convergent and divergent thinking abilities, two creative capabilities that are linked to academic success.

3 - Consumer Search and Product Returns
Marat Ibragimov, Massachusetts Institute of Technology, Cambridge, MA
John R Hauser, Siham El Kihal
Online retailers are challenged by frequent product returns with $428 Billion in merchandise returned to US retailers in 2020 (National Retail Foundation 2021). Typically, product returns are studied in a purchase/post-purchase framework. However, online retailers have access to the information which precedes the purchase decision - consumer search. We demonstrate that this information provides a low-cost opportunity to better understand and predict product return behavior. Using data from a large European apparel retailer: (1) we document that adding consumer search behavior improves the prediction of product returns; (2) we find correlational evidence that using search filters, spending more time, and purchasing the last item searched are negatively associated with the probability of a return; (3) we propose an empirical-theoretical framework that jointly models consumer search, purchase, and returns decisions and estimate parameters on our data; (4) we use the proposed framework to test strategies of product return management which could help to improve profits and consumer satisfaction.

4 - Linking Color Palettes to Brand Attributes
Daria Dzyabura, New Economic School, Moscow, Russian Federation
Renana Peres
Visual design, a key element across the marketing mix, is conducted largely using qualitative principles. While many marketing decisions are increasingly made using quantitative metrics, and most recently artificial intelligence algorithms, visual design is done by graphic designers, who follow generally accepted artistic and aesthetic principles. In this research we quantitatively map the relationship between colors and brand attributes. We collect consumers' visual collage representation of their associations with a brand, as well as their perception of that brand. We use a two step approach to extract colors from the collages in a way that is rich enough to allow for nonlinearity, combinations of different colors, and different shades of colors, but at the same time tractable enough to regress on brand attributes. We first reduce the original color RGB space of 16 million colors (256^3) by grouping colors in the CIE wavelength space so that very similar shades of one color are grouped together. Second, we run LDA on the resulting 512 colors, which generates the color equivalent of topics - combinations of colors that appear together and therefore represent a thematic meaning. We then regress the frequencies of color palettes in the collages on brand attributes, as rated by the same respondents. This regression indicates which color palettes are positively or negatively associated with each brand characteristic. Finally, we validate the results by showing participants otherwise identical ads colored in each of the color palettes. We find that the resulting brand perceptions match those predicted by our model.

FC06

Virtual Room 06
AI Algorithms
Contributed Sessions
Chair: Malika Korganbekova
Northwestern University, Evanston, IL

1 - Competing Ad Targeting Policies using Reinforcement Learning
Poet Larsen, Marshall School of Business, Los Angeles, CA
Reinforcement Learning algorithms-more specifically multi-armed bandit (MAB) algorithms-are becoming increasingly popular methods used by firms to learn targeted advertising policies. However, little is known about the behavior of these algorithms when competing in advertising settings. In this paper, we ask the following question: Can independent competing targeted marketing strategies, operationalized using MAB algorithms, implicitly learn to segment markets with only consumer response data? We investigate this question with a reduced-form model of advertising and a set of simulations that suggest competing MAB algorithms can independently learn coordinated market segmentation policies without communication, public monitoring, or explicitly accounting for competition. Additionally, we find evidence that suggests market segmentation outcomes

may be driven by randomness, i.e., early draws from the reward distribution impact how the market is sliced. Finally, we explore several market factors that meaningfully impact market segmentation behavior. Our results help marketing academics and practitioners better understand how MAB algorithms behave in competitive advertising settings.

2 - Cold Start to Improve Market Thickness on Online Advertising Platforms: Data-driven Algorithms and Field Experiments

Zikun Ye, UIUC, Urbana-Champaign, IL
Dennis Zhang, Renyu Zhang, Chen Xin, Xin Chen, Heng Zhang

Cold start describes a commonly recognized challenge for online advertising platforms: with limited data, the machine learning system cannot accurately estimate the click-through rates (CTR) of new ads and, in turn, cannot efficiently price these new ads or match them with platform users. Traditional cold start algorithms often focus on improving the learning rates of CTR for new ads to improve short-term revenue, but unsuccessful cold start can prompt advertisers to leave the platform, decreasing the thickness of the ad marketplace. To address these issues, we build a data-driven optimization model that captures the essential trade-off between short-term revenue and long-term market thickness on the platform. Based on duality theory and bandit algorithms, we develop the Shadow Bidding with Learning (SBL) algorithms with a provable regret upper bound of $O(T^{2/3}K^{1/3}(logT)^{1/3}d^{1/2})$, where K is the number of ads and d captures the error magnitude of the underlying machine learning oracle for predicting CTR. Our proposed algorithms can be implemented in a real online advertising system with minimal adjustments. To demonstrate this practicality, we have collaborated with a large-scale video-sharing platform, conducting a novel, two-sided randomized field experiment to examine the effectiveness of our SBL algorithm. Our results show that the algorithm increased the cold start success rate by 61.62% while compromising short-term revenue by only 0.717%. Our algorithm has also boosted the platform's overall market thickness by 3.13% and its long-term advertising revenue by (at least) 5.35%. Our study bridges the gap between the bandit algorithm theory and the cold start practice, highlighting the value of well-designed cold start algorithms for online advertising platforms.

3 - Platform Design and Supplier Response

Malika Korganbekova, Kellogg School of Management, Northwestern University, Evanston, IL

On two-sided platforms, there are information frictions between suppliers and the platform itself: suppliers, while setting their wholesale costs and on-platform sponsored advertising budgets, are uncertain as to how these strategies will translate to the ranking of their products on the platform. That is, suppliers do not have full knowledge over the Artificial Intelligence algorithm employed by the platform to rank products. In this paper, we investigate how sophisticated and fast suppliers are in terms of reacting to the changes in the ranking system. More specifically, North American durable goods platform we collaborate with, ran a ranking experiment where a product was assigned a score and we use discontinuities in the product scores to estimate quasi-experimental effects of the ranking changes on subsequent changes in supplier wholesale costs and sponsored advertising budgets. We find that there's significant heterogeneity in how different suppliers respond to the changes in the ranking system depending on suppliers' experience with the platform and number of products carried. Next, using pricing and sponsored ad experiments ran by the platform, we estimate causal benchmarks of the effectiveness of modifying wholesale costs and sponsored ad bids. We develop a Bayesian learning model to recover suppliers' beliefs about the effectiveness of the above-mentioned wholesale cost and sponsored bid changes to estimate the information gap between supplier beliefs and causal estimates of these strategies. Using counterfactual simulations, we show that in the full information setting when suppliers know causal effects of price and sponsored bid changes, both platform and suppliers can benefit, and consumers will face lower prices.

FC07

Virtual Room 07
Digital Economy II
Contributed Sessions
Chair: Willem Smit
Asia School of Business, Kuala Lumpur, Malaysia

1 - Consumer, Investor, and Philanthropist Mindsets of Crowdfunding Backers

Hyunjung Crystal Lee, Universidad Carlos III de Madrid, Madrid, Spain
Mercedes Esteban Bravo, Jose Manuel Vidal Sans

The current paper delves into different segments of crowdfunding backers based on their mindset, the basic traits underlying these mindset segments, and how the financial contribution to a project changes with their mindset. Based on empirical evidence from three studies, we demonstrate that potential sponsors can adopt six different mindsets: three pure cases that we describe as a consumer, investor, and philanthropist mindset, and three mixed cases that combine

the two of the mindsets. Then, we show how the mindset of potential backers can affect their financial response to a project. Lastly, we propose a general conceptual framework about these mindsets and how they are determined by combinations of four basic psychological traits (abstract-concrete, present-future, self-other, and trust-skepticism), conditioning them to place different emphasis on the perceived attributes of a crowdfunding project, thus on their valuation of and financial contribution to the project. The theory is validated by three empirical studies. The first study, a randomized factorial experiment, shows how the crowdfunding backers' mindsets change their financial contribution amount depending on the specific attributes of crowdfunding project descriptions. The second study validates the psychological traits underlying the backers' mindset. The third study demonstrates how the psychological distance between the constituents of backers' mindset and the perceived presence of these traits in a project can explain the contribution amount. The results are relevant for crowdfunding platform managers and project creators, who can select or emphasize the most appropriate characteristics of a project for potential backers based on their mindset.

2 - Technology Adoption, Customer-connecting and Back-office Business Model Digitalization for Start-up Performance

Willem Smit, Asia School of Business, Kuala Lumpur, Malaysia
Erkko Autio, Kun Fu

Recently, much research attention has shifted towards business model (BM) digitalization and marketing; however, the treatments of this topic have lacked nuance. As BM digitalization is a complex and multi-dimensional phenomenon, it is important to differentiate the various mechanisms through which it can create value for customers and the firm. Our model theorizes and tests four different value-driving mechanisms digital technology adoption and BM application can have on firm performance. We hypothesize the first mechanism is driven by novel combinations of digital technologies. The second and third mechanisms are related to the extent to which digital technologies have been applied in back-end and customer-connecting business model activities. Finally, BM digitalization enables business model experimentation which in turn improves business performance.To empirically explore the value-driving contributions from BM digitalization dimensions, we surveyed 685 'digital entrepreneurs' in six Southeast Asian countries to test these in a cross-national and emerging market context. We perform regression and mediation analyses to test the hypotheses. Our analyses distinguish between 'customer-connecting' and 'backbone' digitalization

in start-up business models and show that while both drive operational and competitive (against peers) performance, it is backbone digitalization that drives performance through business model experimentation and digital technology adoption. Customer-connecting digitalization appears to have become a given but is not associated with digital adoption-driven competitive advantage.

FC08

Virtual Room 08
Choice Modeling III
Contributed Sessions
Chair: Ram C Rao
University of Texas- Dallas, Richardson, TX, 75080-3021,

1 - Implications of State-dependent Play Behavior in Video Gaming: An Individual Level Analysis

Bruno Castelo-Branco, University of Michigan, Ann Arbor, MI
Puneet Manchanda

In this paper, we leverage data from a major video game distribution platform to investigate how users decide which games to play and how their choices are intertemporally related. More specifically, the longitudinal data set includes the time users played each game on each day, as well as the purchase of new games, thus allowing us to use a structural approach to investigate how state-dependence influences players' consumption leading to behaviors such as addiction and variety-seeking. We discuss how the results can be relevant for the platform, game developers, and policymakers.

2 - Dual Role of Price in Consumer Choice

Sungjee Choi, PhD Candidate, University of Iowa, Iowa City, IA
Gary J Russell

Consumers commonly trade off price and quality in their purchase decisions. However, consumers cannot easily judge quality. In these circumstances, consumers use price as a quality cue to alleviate uncertainty in their decision-making process. The goal of the study is to understand the relationship between price and quality. The key assumption in this study is consumers believe that there is a positive correlation between price and quality. For this reason, price serves a dual role -- both as a constraint on choice and as a signal of product quality. Because these two effects work in opposite directions, consumers are expected to exhibit relatively less price sensitivity in the presence of a price-quality association (P-Q). Moreover, higher-priced

brands should be expected to face a relatively less elastic demand in the presence of a P-Q association. To examine these predictions, we develop a choice model that allows for P-Q associations to impact consumer price response. The model is applied to scanner data choice histories in the margarine product category. Results imply that the strength of the P-Q association varies across the consumer population. Consumers who have a strong P-Q association are not as price sensitive as consumers who have a weak P-Q association. This suggests that variation in P-Q strength moderates the demand elasticity facing high-priced brands. We discuss the implications of our findings for future research.

3 - Rational Inattention and Brand Choice
Ram C Rao, University of Texas- Dallas, Richardson, TX
The Multinomial Logit Model has been a workhorse in empirical studies in marketing. It has been used extensively in modeling brand choice. Recent work has offered Rational Inattention as a foundational basis for the logit model. That is largely a theoretical exploration. Several questions arise for the marketeer. First, is there any advantage to using the RI approach as opposed to the conventional approach of maximizing consumer's random utility? If indeed there is an advantage, would the resulting empirical model differ from the logit model? And if so, in what ways? Would it present new econometric challenges? Since the RI approach essentially results in stochastic choice, how is that related to the stochastic models of consumer behavior developed by marketing researchers? Answering these questions leads to several findings in this paper. On the theoretical front the precise conditions are identified that result in a limiting case of the RI model to be identical to the Bass model of stochastic preference. Also identified are the conditions that make the empirical counterpart of the RI model equivalent to the logit model. However it is readily seen that these conditions are unlikely to hold in practice, thus making the RI approach an alternative to the logit model. The RI approach is shown to have the advantage of being able to separate the effects of price, for example, that affects consumption utility from the effects of an advertisement that affects information endowment of the consumer. This parceling out of marketing mix variables is generally not possible in the logit model. However, the implementation of the RI based model can pose significant identification challenges and therefore it could well be that the MNL is adequate for most practical situations.

FC09

Virtual Room 09
Information Acquisition in Consumer Choice (Session III)

Special Sessions
Chair: Ivy Dang
University of Hong Kong, Hong Kong, China

1 - Estimation of Sequential Search Model with Search Set Membership
Jae Hyen Chung, Assistant Professor, The Chinese University of Hong Kong, Hong Kong
I propose a methodology to estimate the sequential search model without the consumer search order. For the estimation of the sequential search model, the search order has been considered to be an integral part to recover the parameters of interest, including preference parameters and the search cost parameters. However, often, datasets that show the order of searches may not be available to researchers, making it impossible to estimate the model without making additional assumptions about the search orders. To overcome such restrictions, I propose a method to estimate the sequential search model by adopting the expectation-maximization algorithm. I present a simulation study to demonstrate the parameter recovery of the proposed method and compare other methods that can be used in cases with the similar data availability.

2 - Searching for Rewards
Xu Zhu, The Chinese University of Hong Kong, Hong Kong
T. Tony Ke
Reward program is a commonplace in many markets. It allows enrolled members to receive rewards based on their past purchases and redeem these rewards for future purchase. Based on a repeated ordered search framework, we propose a new theory for reward programs in a frictional market. Consumers search for product information sequentially over many firms, each of which offers two independent products in two periods. Consumers make a purchase from one firm in each period. We find that firms use both price discounts and rewards to attract consumers, where price discounts deter consumers from continuing to search other firms in the current shopping trip, while rewards enable the firm to gain prominence in consumers' next shopping trip. Consequently, as the search cost gets higher, firms offer lower price discounts but higher rewards. Overall, reward programs always decrease industry profit and raise/reduce consumer surplus when the search cost is high/low.

3 - Antecedents and Consequences of Wish Listing: Empirical Evidence from an E-commerce Platform
K Pallavi Jha, PhD Candidate, University of Pittsburgh, Pittsburgh, PA
Ivy Dang

Consumer decision journey has evolved due to the advancement of digital technology. To facilitate consumer's shopping journey, many e-commerce sites have developed the wishlist function, where consumers can search products and add them to wishlists before finally purchasing or eliminating a product. Though important, very few prior works have studied wishlists in detail. Leveraging a rich clickstream dataset from an e-commerce platform in Asia, we try to understand the antecedents and consequences of wishlisting: Why do consumers add products to wishlists? Which session and consumer characteristic influence wishlist addition? And does wishlist addition have an impact on purchase? Our objective is to explore the consumer's decision funnel of wishlisting. In the first stage, we examine the impact of session and consumer characteristics on wishlist addition. In the second stage, we examine the influence of wishlist addition on purchase. We also hope to connect our findings with consumer consideration set formation process. This study will extend our understanding of online consumer decision journey by examining the wishlisting process in detail. Lastly, we will derive managerial implications of wishlisting for e-commerce platforms.

4 - Sequential Search Models: A Pairwise Maximum Rank Approach

Jiarui Liu, The University of Chicago, Chicago, IL
This paper studies a generalized sequential search model that allows for endogeneity and unknown distribution of consumers' match value. Endogeneity arises when unobserved product quality affects both consumer choices and product observed characteristics (e.g. price or rankings on online search intermediaries). Ignoring endogeneity when it is present, or misspecifying the match value distribution leads to biased estimates of preferences and search costs. A likelihood approach to estimate the generalized model gives biased results. Therefore, I propose a new estimator - pairwise maximum rank (PMR) estimator - for both preference and search cost parameters. I show that the PMR estimator is consistent using only data on consumers' search order within any pair of products rather than data on consumers' full consideration set or final purchase. Additionally, we can use the PMR estimator to test for the true match value distribution in the data. In the empirical application, I apply the PMR estimator to quantify the effect of rankings in Expedia hotel search using two samples of the data set, to which consumers are randomly assigned. One sample has endogenous rankings, and the other sample has randomly generated rankings. I find the position effect to be 0.11-0.36 usd, and the effects estimated using the two samples are similar.

FC10

Virtual Room 10
Marketing and Regulation
Special Sessions
Chair: Sarah Moshary
University of Chicago, Chicago, IL

1 - Strategic Avoidance and Welfare Impacts of U.S. Solar Panel Tariffs

Bryan K Bollinger, NYU Stern School of Business, New York, NY
Todd Gerarden, Kenneth Gillingham, Drew Vollmer, Daniel Xu
This study examines the effects of a series of tariffs imposed by the on imported solar panels in 2012, 2014, and 2018. To do so, we bring together data on solar panel manufacturing, imports, and pricing. We first present evidence of tariff avoidance behavior by solar panel manufacturers, including strategic offshoring of production. We develop a strategic tariff" measure that accounts for this tariff avoidance behavior, and we find that strategic tariff rates differ substantially from statutory tariff rates. In particular, they are much lower than statutory rates in 2012 and 2014. In contrast, avoidance of the 2018 tariffs was more difficult due to their broad-based nature, and this is reflected in higher strategic tariff rates. We embed these strategic tariff rates in a Cournot model of manufacturer competition that appears to match the market, and include a dynamic model of solar demand to quantify the real impacts of tariffs on solar panel prices, solar panel adoption, and heterogeneity in manufacturers' responses. We find strong evidence that firms relocated production due to the tariffs. We further show that the tariffs produce small gains for firms with domestic manufacturing, but this comes at the cost of large losses for consumers and installers.

2 - Advertising Content and Quantity

Avery Haviv, Simon School of Business, Rochester, NY
In a digital advertising context, firms are able to quickly make changes to their marketing plans, as ad auctions are performed shortly before delivery. However, most television advertising by large firms is pre-committed in the upfront market, which takes place in Spring. This market was worth 9 billion dollars in 2018. Pre-commitment might prevent firms from changing their advertising spending in response to the state of their rival, though they are still able to change their advertising content. I develop a dynamic structural model to investigate how firms advertising behavior changes when they are able to adjust their advertising spending on a monthly basis, in response to their rivals advertising spending, and brand equity. I study the effect of this pre-commitment problem in the duopolistic US consumer battery market.

Advertising effectiveness is identified by looking at how variation in category demand correlates with the relative demand of branded batteries.

3 - Marketing and Experimentation for Behavioral Change: Adapting to Drought in California

Kristina Brecko, University of Rochester, Rochester, NY
Wesley Hartmann

This project examines whether smart technology products can shift behavior of those unmotivated by a social objective. In the context of drought in California, we implement a field experiment to evaluate the drivers of adoption of such products and measure their effectiveness in altering water usage. In conservation settings, the biggest opportunities for change can reside with those consumers who place a high value on use of the resource and/or face high costs of reducing their consumption of the resource. Smart technology products have the ability to conserve resources while addressing both concerns; e.g., in our context, they can improve the health of the landscape while efficiently using water. Evaluation of this type of program is complex and not well addressed with traditional RCTs that apply a non-scalable level of treatment on a self-selected population. Compliance will be low, since the solution is for a potentially narrow yet difficult to target segment. To address these challenges, we frame the compliance problem as a marketing problem. We design a sequence of experiments that (i) test drivers of adoption and (ii) use those learnings to promote wide-scale adoption to evaluate effectiveness of the product on the treated population. We find that scaling adoption of an IOT irrigation controller involves a mix of price incentives and installation services. This allows us to evaluate impacts on the efficiency of irrigation.

4 - A Consumer-centric Framework for Firearms Regulation

Sarah Moshary, University of Chicago, Chicago, IL
Bradley T. Shapiro, Sara Drango

This paper estimates consumer demand for firearms with the purpose of evaluating the likely impacts of firearm regulations. We first conduct a stated-choice-based conjoint analysis and estimate an individual level demand model for firearms. We validate our estimates using aggregate moments from observational data. Next, we use our estimates to simulate changes in the number and types of guns in circulation under alternative regulations. Importantly, we find that bans or restrictions that specifically target assault weapons increase demand for handguns, which are associated with the vast majority of firearm-related violence.

We also find that the consumer surplus associated with firearm purchase is sufficiently high that an outright ban on firearms may be infeasible both politically and economically.

FC12

Virtual Room 12
Managing Product Returns
Special Sessions
Chair: Sara Valentini
Bocconi University, Bologna, Italy
Co-Chair: Scott Andrew Neslin
Tuck School of Business at Dartmouth, Hanover, NH
Co-Chair: Elisa Montaguti
University of Bologna, Bologna, Italy

1 - Is it How You Start How You Finish? Customer Return Rate Evolution Over Time

Tulin Erdem, New York University, New York, NY
Siham El Kihal, Christian Schulze

Do customers' product return rates evolve over time? If so, what influences this evolution and how do previous experiences with an online retailer as well as customer-specific characteristics impact evolution patterns across customers? Moreover, what is the implication of this evolution on profits? This article provides answers to these questions. The results show that (1) the majority of customers exhibit increasing return rates over time, (2) purchase feedback (e.g., customers' learning about product quality and fit) decreases return rates, (3) there is a strong positive state dependence in customer return rates as current return rate is an increasing function of past return rates, implying learning about the return process and habit formation, (4)socio-demographic and psychographic customer characteristics do not have a substantial impact on customer return rates, and (5) customers with an increasing return rate are 40% less profitable in the first year and 50% less profitable after five years than customers with a decreasing return rate. These findings highlight the need for managers to consider customer return rates evolution in their decision making.

2 - It's Not Only What They Buy, it's Also What They Keep: Linking Marketing Instruments to Product Returns

Edlira Shehu, Copenhagen Business School, Copenhagen, Denmark
Siham El Kihal

Online retailers implement various marketing instruments to boost their sales. These marketing instruments can not only impact sales, but also product returns. However, when assessing their performance, retailers often ignore potential return effects. Theoretically, marketing instruments could increase or decrease returns, depending on how they affect expected and experienced costs and benefits related to a product. In this paper, we empirically examine whether, and how a comprehensive set of marketing instruments (newsletters, catalogs, coupons, free shipping, paid search, affiliate advertising and image advertising) affects product returns. We use data from two major online retailers and show that return effects vary largely across marketing instruments. Surprisingly, none of the instruments reduces product returns. Newsletters, paid search, catalogs and free shipping increase returns substantially by up to 18%. For free shipping and catalogs, the return effects emerge prevalently for fashion categories, whereas online advertising and newsletters increase returns of both fashion and non-fashion products. These findings enhance our understanding of how firm-initiated marketing instruments affect returns and provide guidance for online retailers in multimedia environments.

3 - Promoting Product Returns: Effects of Price Reductions on Customer Return Behavior

Tammo H A Bijmolt, University of Groningen, Groningen, Netherlands
Christian Friedrich Hirche, Maarten Gijsenberg

Online retailers vary product prices over time, in order to influence customer purchase behavior. Problem is, customers might also change their return behavior based on observed and paid prices. Price reductions thereby potentially affect returns both of purchases made during the price reduction and of purchases made before the price reduction but which are still eligible for returning. This study investigates the influence of both at-purchase and post-purchase price reductions on product returns using a unique database of a large European online retailer containing more than 83.7 million purchases and more than 37.5 million returns in over 300 product categories. Results show that both at-purchase and post-purchase price reductions can both foster and lower product returns, depending on prior customer behavior. While both types of price reductions lead to more returns for customers that have returned due to a similar type of price reduction before, they also lead to fewer returns for customers that have not returned due to a price reduction before. We discuss managerial implications based on the result that accounting for the impact of price reductions on product returns helps online retailers to increase their profitability.

4 - Free Riding the Return Stock: How to Turn Returns into a Profit Driver

Scott Andrew Neslin, Tuck School of Business at Dartmouth, Hanover, NH
Elisa Montaguti, Sara Valentini

Returning products has become standard practice among consumers, and the habit of returning merchandising does not diminish over customers' lifetime. Returns have become a significant pain point for online retailers. However, it is exacerbated by retailers' marketing activities, which can encourage customers to make riskier purchases, thus producing more returns (Shehu et al., 2020). Paradoxically, we contend that returns in fact can enable retailers to allocate marketing moreefficiently and hence maximize profits. Specifically, firms can maximize profits by optimally allocating marketing resources to feed the stock of 'goodwill' generated by product returns. This stock translates into increased profits in the long term. To test this hypothesis, we estimate a four-equation model that traces the impact of different marketing activities on purchase behavior, order size, decision to return, and the amount returned. The model includes a return stock variable capturing the dynamic effect of returns on purchase behavior. We then dynamically optimize the marketing resource budget allocation taking into account returns. Our results show that the return stock dynamics can be leveraged to increase customer profitability. As a result, companies can free ride on product returns and increase profits by better shaping their marketing activities. We also show that ignoring the product return dynamics will lead managers to incorrect marketing decisions.

FC13

Virtual Room 13
Social Media: Engagement
Contributed Sessions
Chair: Bruce Dore
McGill University, Montreal, QC, Canada

1 - Social Pricing Across Products and Consumers: Randomized Field Experiments on a Comprehensive Online Retailer

Haibing Gao, Renmin University of China, Beijing, China
Online retailers are meshing their pricing strategies with consumers' social networks, aiming to reach the pattern of social pricing: i.e., consumers with higher social network value enjoy better (cheaper) prices. For example, many online retailers allow consumers to invite peers from social networks to request a discount for their purchases. Under social pricing, online retailers may benefit from more sales and profit

because it encourages more proactive social interactions among consumers and thus produces larger social influence on peers' purchases. By collaborating with a comprehensive online retailer in China, this study conducts several randomized field experiments to investigate the effectiveness of social pricing across products and consumers. The first experiment shows that usefulness of social pricing varies with product and consumer characteristics. We find that social pricing is more effective in promoting new products than existing products. Exploration of the underlying mechanism shows that new products can more readily attract consumer attention and thus encourage information sharing among social networks. Moreover, social pricing is more effective in enhancing sales and profit among experience products than search products. The underlying cause is that consumers have greater desire to share purchases of experience products (vs. search products). The second experiment shows that social pricing is more effective among variety seeking consumers of different brands than loyal consumers of the same brand, if the retailer's goal is to stimulate cross buying of different brands. However, social pricing is more useful among loyal consumers (than variety seeking consumers), if the retailer's purpose is to promote repeat purchases of the same brand.

2 - Digital Content Exploration: The Tradeoff Between Self-navigation and Limited Recommendations
Qi Xie, University of Minnesota, Minneapolis, MN
Linli Xu, George John
The dramatic growth of digital content platforms has significantly expanded consumers' content access but also led to an information overload problem. Hence, the recommendation system has been widely used by digital content platforms to facilitate consumers' content exploration process. In general, most recommendation systems could be classified into two types: a self-navigation recommender and a single-item embedded recommender. The former generates a large number of alternatives for consumers to choose from, whereas the latter is only recommending a single item embedded in a clicked content. Using data from a short-video platform that employs both recommendation systems, we explore how the interaction of these two systems influences users' digital content consumption. Our model-free evidence suggests a non-sequential responding path under the self-navigation mode and a synergy between the two recommendation systems. We then build an empirical model encompassing a sequence of micro decisions to describe consumers' searching and viewing actions. The results further indicate the duration and the number of videos a user has browsed the front page as well as the content variety, quality and position can affect both the flow of users' exploration process and their viewing choices. We also find that a higher level of content variety from previously viewed videos could help drive more subsequent consumptions.

3 - Brand Activism on Social Media and Consumer Responses
Seoyoung Kim, Doctoral Candidate, University of Georgia, Athens, GA
Sundar G Bharadwaj
Notwithstanding the inherent risk of speaking out about social controversies, brands are feeling the pressure to participate in the wave of activism and take a stand on various social problems. Faced with the dilemma of escalating calls for activism and the inevitable riskiness of activist actions, brands are still left uncertain about whether and how they can advantageously incorporate activism in their marketing communication on social media. Against this backdrop, this study investigates conditions under which a brand's activist action can generate favorable consumer responses. Analyzing a rich multi-source daily panel dataset composed of brands' activist actions on social media (i.e., Instagram) and extensive panel survey on brand perception with Bidirectional Encoder Representations from Transformers (BERT) and causal inference techniques, this study suggests that a brand's activist action that is comprehensible, truthful, sincere, and legitimate can engender favorable consumer responses towards the brand. Overall, this study is expected to contribute to theory and practice by shedding light on how brands can overcome the risk of being an activist and how brands should implement brand activism.

4 - Informational Components of the Social Spread of Digital Content
Bruce Dore, McGill University, Montreal, QC, Canada
Marketing research has identified correlates of the spread of digital content but has not yet identified patterns of text meaning that predict this spread with high accuracy. We used machine learning to develop a language-based signature of content sharing, trained on over 3 million messages from social media. Specifically, we apply a technique known as word embeddings to represent the meaning of social media posts. Next, we use these embedding vectors as input variables to a partial least squares model trained to predict sharing counts. This resulted in a linguistic signature of social sharing (a pattern of regression weights across semantic vectors) that can be used to make sharing predictions in held-out social media data. This signature predicted sharing with substantially higher accuracy than models drawn from prior theory, generalizing across content categories, publishers, and time. Signature expression was not highly predictive of excess message liking or commenting, suggesting that it is

not an index of positive evaluation or general engagement, but specific to social transmission. The components of this signature spanned multiple psychological categories, including negative affect, temporal focus, social perspective, and perceptual processes, with no single category necessary or sufficient for the signature's overall predictive efficacy. Finally, we show that contextualized, publisher-specific versions of the signature reach even higher accuracy than the generalizable 'one-size-fits-all' version, indicating that the content drivers of content sharing vary substantially by context. Overall, this work derives an interpretable text-analytic model of the sharing potential of digital content, providing a basis for new taxonomies of the content dimensions and social processes that drive the spread of information at scale.

FC14

Virtual Room 14
Text, Digitization, and NLP I
Contributed Sessions
Chair: Serena Pugliese
Bocconi University

1 - Encouraging Donors to Donate in Donation-based Crowdfunding: A Network Representation Learning Approach
Jiyeon Hong, University of Wisconsin-Madison, Madison, WI
Qing Liu
Improvement in donor retention is one key aspect for nonprofit organizations (NPOs) to sustain their businesses. In our empirical context of this project, its potential impact is further highlighted by the fact that only about 30% of all donors make more than one contribution on DonorsChoose. org, a donation-based crowdfunding platform. Economic theory suggests that reducing the non-financial costs of making a contribution should increase donor retention. In this regard, we focus on developing a recommendation tool to help donors quickly identify projects likely to be of their greatest interest. However, the dominance of one-time donors presents a challenge for existing recommendation tools (e.g., user-item collaborative filtering). Such tools generally rely on a long history of user activities to infer user interest for recommendation, but we cannot rely on that rich information in our context. To address this challenge, we leverage advances in Network Representation Learning using the underlying network structure to enrich the available information on donors' interests. Specifically, we leverage autoencoders to incorporate topological relationships

between donors and projects as well as the donor- and project-level attributes. Results from our preliminary substantive analysis reveal different drivers of donation for different donor segments. Based on our findings, we aim to provide managerial insights on how to tailor marketing messages for each segment to achieve a higher donor engagement in the platform.

2 - Leveraging Consumer Complaints to Make Product Recall Decisions
yujie Qu, Central South University, Changsha, China
Wen Shi, Jia Liu
This paper develops a methodological framework that can predict product recall probability and facilitate the creation of recall statements, based on past consumer complaints which have been acknowledged as the main trigger of product recalls in practice. The framework is built on a nonparametric Bayesian topic model, called Hierarchical Dual Pitman-Yor Process (HDPYP). HDPYP can extract defect topics and quantify the relative semantic importances of all complaints that are associated with the same recall statement. HDPYP can be empowered by any prediction model (e.g., logistic regression, survival model, and random forest), which can predict the probability of whether a product will be recalled from the market given all the complaints observed so far and the estimated importances from HDPYP. HDPYP can also estimate the extent to which each defect topic in consumer complaint is deemed summary worthy by the people who need to write the recall statement. We apply our proposed framework in automobile complaints and recall data sets from the U.S. automobile market. We show that our topic model can generate meaningful substantive insights. We also show that our topic model can provide a more meaningful way to aggregate all the information across consumer complaints so that prediction accuracy can be significantly improved under any prediction model.

3 - From Sale Descriptions to Perceived Warmth and Competence of Providers
Hamid Shirdastian, Concordia University, Montreal, QC, Canada
Michel Laroche
Building on the speech act theory, we examined how sale descriptions have an impact on consumers' social cognitions of service providers and how they could be used to generate new content. Previous studies only focused on general linguistic characteristics. However, we added to the social cognition literature by examining the combination of warmth and competence in an in-field observation of user-generated content in the sharing economy context. The dataset contained 398,926 reviews for 11,678 Airbnb

properties, located in a North American city (from August 2010 to November 2021). We measured how different types of service providers (amateurs vs. professionals) and certain concreteness levels (abstract vs. concrete) change the perceived warmth and competence of the service providers. Applying Natural Language Processing (NLP) methods, we analyzed the guest reviews and the property descriptions and found lower perceived warmth and competence for amateur hosts as well as higher social cognition from more concrete descriptions. Moreover, we discovered that in abstract descriptions, amateurs used a more positive sentiment description than professionals. Not only did the results suggest that higher positive listing sentiment led to more positive social cognition but also it fully meditated the effects of listing concreteness on social cognition. The findings showed the role of linguistic concreteness and sentiment analysis on both social cognition dimensions for service providers. The research not only contributes to more easily incorporating linguistic theories in marketing but also advances the literature in terms of understanding how textual communications influence user perceptions. It could also help develop more accurate Natural language generation (NLG) algorithms to communicate.

4 - Culture of Innovation: A Comprehensive Literature Review using Latent Dirichlet Association

Serena Pugliese, Bocconi University, Milan, Italy
Verdiana Giannetti, Sourindra Banerjee

Firms and countries need to develop a culture where innovation flourishes in order to survive and thrive in today's ever-changing environment. Against this backdrop, the concept of culture of innovation has long captured the attention of academics and practitioners (Tellis, Prabhu, and Chandy 2009). While research on innovation has been organized into systematic frameworks (Rubera and Kirca 2012), research on culture of innovation has not been organized into such systematic frameworks. Research in this area can be classified into two broad streams: (1) research on the impact of national culture on innovation within a country and (2) research on the impact of organizational culture on innovation within a firm (Tellis et al. 2009). We argue that the concept of culture of innovation is far more nuanced, therefore requiring a deep dive analysis. In order to approach this task as objectively as possible, we use NLP techniques, in parallel with our manual classification, at each step of the literature review process. Although there is no standard NLP ready-to-use method that we can easily reapply for this task, when we focus on the individual steps of a literature review

process, different NLP methods can be applied at each step to assist researchers in identifying the necessary papers and how they are related.

Friday, 12:45pm–1:45pm

FD02

Virtual Room 02
Product Adoption
Contributed Sessions
Chair: Kanoko Go
Atomi University, Niiza-shi, Japan

1 - Marketing Ability and Product Choice: A Game Theory Approach

Chi-Cheng Wu, National Sun Yat-sen University, Kaohsiung City, Taiwan
Vu Linh Trang

This study demonstrated the impacts of marketing capabilities on the choice of product by businesses through a detailed investigation into the case of Samsung TVs. While OLED panels are significantly appreciated by experts and researchers as a whole new level of technology for TV display (Jia, 2018; Sheedy, Hayes, & Engle, 2003; and Jang, et al., 2019), QLED panels are modestly considered as an advanced version of the classic LED screen. Despite numerous predictions from experts along with the public, Samsung had been unexpectedly determined with its decision of making QLED TVs as its major TV offerings. This research approached and analyzed this decision of Samsung vis a game theory model. The results showed that Samsung with its competitive Marketing capabilities compared to LG would benefit the most when producing QLED TVs despite the less competent technology that this panel type possesses compared OLED TVs. Samsung in this case could obtain benefits from its significant product differentiation and effective Marketing ability. From the theoretical view, the outcome of this study has confirmed the findings of a number of previous researches and studies on the role that marketing capabilities play as a driver of an organization's performance. The study's outcomes have first fortified what has been suggested by Makdok (1998) or Masaaki Kotabe and Aulakh (2002) that enterprises could enjoy privileges from its customers through owning capabilities. In this case, even though Samsung is using a technology that is less superior compared to what used by its rivals, it is still a market leader by being able to reach an optimal level of marketing efficiency.

2 - How do Variety-seeking Consumers Respond to Product Assortment Changes: Evidence from Vending Machines

Yi Zhang, Hong Kong University of Science and Technology, Hong Kong
Andrew Ching, Jia Liu, Kohei Kawaguchi

In the retail industry, it is believed that introducing new products and replacing existing products is essential for keeping the product lineup updated and attractive. Using a novel data set of vending machines purchases in Japan railway stations and a synthetic diff-in-diff framework, this paper studies how consumers with different variety-seeking tendency respond to such product assortment changes. We find that introducing new products increases the sales for a vending machine by attracting new consumers. Moreover, new products do not cannibalize the sales of existing products. We also show that, although removing consumers' favorite products reduces the sales in the vending machine, keeping diverse product assortments within-and-between vending machines prevents drops in sales due to within- and between-vending machine substitution from consumers. We also find that low variety-seeking consumers are more likely to substitute between vending machines due to the search of their favorite products, while high variety-seeking consumers tend to stay within the vending machine for other products.

3 - Integrating Scenario into Consumer Decision Model

Kanoko Go, Atomi University, Saitama, Japan

In recent years, products have become smart as they are able to connect to the Internet and other devices. Such feature provides consumers with multiple scenarios of product usage. Therefore, these scenarios have attracted considerable interest in consumer decision-making research. With regard to consumer decision-making, the multi-attribute decision model has traditionally been studied. However, when the product is complicated or having a new attribute, the model is difficult to apply. Therefore to deal with such as an under uncertain situations, the case-based decision model in which consumers made inferences based on their past experiences was proposed. Although these models can explain product evaluation itself, they do not consider scenarios making from product value. In this study, I aim to integrate product usage scenarios into consumer decision-making models (the multi-attribute decision model and the case-based decision model). Specifically, three types of models are developed to adjust the integration of scenarios. In the first model, it is assuming consumers evaluate products and scenarios separately. In the second model, they evaluate products according to the most interesting scenarios. In the third model, they evaluate the products under each scenario.The three models are

investigated through a questionnaire survey on the adoption decision for a smart display. The following five scenarios are examined for the smart display: It can make your home a smart one, It can make a call, It allows streaming, It allows browsing of recipes via voice operation, and It can be used to play voice games. As a result of estimations, the first model in which consumers conduct product and scenario evaluations yielded the best results. Therefore, this study found that scenarios could be integrated into the consumer decision-making model as a different criterion for product evaluation.

FD03

Virtual Room 03
Influencers, Disclosure, and Misinformation
Contributed Sessions
Chair: Roman Welden
University of Tennessee, Knoxville, TN

1 - The Effect of Misinformation on Healthcare Consumption: Evidence from Prescription Claims

Ivan Belov, PhD Student, USC Marshall School of Business, Los Angeles, CA
Dinesh Puranam

The rapid spread of misinformation, disinformation, and fake news is a major challenge for modern society. Misinformation in the health sector is especially problematic as it potentially (1) imposes an additional financial burden on individuals and healthcare systems, (2) harms individuals taking unproven drugs, and (3) places the community at risk both in the short term and the long term. Consequently, we examine the effect of misinformation on healthcare consumption. Specifically, we ask a) how does a misinformation event affect short and medium-term healthcare consumption? b) are some demographic groups more susceptible to misinformation? c) is the institutional response from agencies like the FDA effective in mitigating the effects of such a misinformation event? and d) how does the spread of misinformation via word of mouth influence healthcare consumption? We exploit an announcement by President Trump regarding an unproven treatment for Covid-19 - Hydroxychloroquine (HCQ). We identify the effect of this announcement on HCQ claims by using prescription claims for other non-Covid drugs as controls. Using Bayesian Synthetic Controls and VAR models, we find evidence that misinformation events have a short-lived impact, institutional responses can mitigate subsequent announcements favoring HCQ, and increased word-of-mouth engagement need not translate to increased HCQ claims. We discuss implications for policymakers, firms, and regulators.

2 - Sponsorships in Livestreaming: Monetization and Disclosure Behavior of Influencers on Twitch

Ivan Li, Stanford GSB, Stanford, CA

Monetization via product placement, sponsorships, or co-branding involves tradeoffs in the form of reduced product quality and/or diminished brand equity due to a sellout effect. Content creators, social media influencers, and even celebrities may obfuscate monetization attempts in order to circumvent brand equity costs. However, we know very little about the prevalence and effects of such attempts. I study such actions using a novel dataset of over 1000 of the most popular English-speaking influencers on Twitch.tv, the largest online video game livestreaming platform. My setting provides unique, quasi-random variation in the intensity of sponsorship disclosure; influencers can choose whether or not to lead their stream title with #ad or #sponsored, depending on how prominent they want to display sponsorships to potential viewers. I find that prominent disclosure is more common among influencers who rarely advertise, while frequently advertising influencers are more likely to obfuscate. I also find evidence for sellout effects of sponsored content decisions. Altogether, these descriptive facts support widespread anecdotes in the online livestreaming industry. I operationalize these findings using a dynamic framework involving advertising and disclosure decisions. My dynamic structural model allows me to quantify the long-run evolution of brand equity and its response to various counterfactual platform policies, such as mandatory full disclosure or levying commissions for external sponsorships.

3 - Post Versus Product Engagement of Influencer Endorsement Posts

Andres Musalem, U. of Chile, Santiago, Chile
Jan Klostermann, Martin Meissner

Influencer endorsements have become a key component of digital marketing strategies. Influencers compete for social media users' attention by creating visually appealing content, and companies sponsor influencers who then endorse their products in personal posts. To measure the effectiveness of social media influencer (SMI) campaigns, marketers commonly track post engagement in the form of likes and comments received by sponsored posts. These metrics, however, do not allow marketers to fully assess the extent to which influencers succeed in directing attention to endorsed products. In this paper, in addition to post engagement, we consider a more direct metric of product engagement, which relies on the number of comments related to the endorsed product in a social media post. We outline a theoretical framework based on vision research that elucidates attentional processes, which differentially affect post and product engagement in the influencer marketing context. In particular, we hypothesize that SMIs face multiple tradeoffs between post and product engagement when creating and posting brand-sponsored content in social media. These hypotheses are tested by analyzing more than 6,000 influencer product endorsement posts on Instagram across two product categories. Our results reveal that some visual features that enhance post engagement decrease product engagement and vice versa. For example, the presence of a human face and smaller product depiction size drive post engagement but reduce product engagement. We then investigate whether these tradeoffs are moderated by the sender of the post. Accordingly, we compare SMI posts with brand-generated posts from the same product category and show that post and product engagement are positively correlated for brand posts, but not for SMI posts. This finding shows that the post vs. product engagement tradeoffs proposed in our theoretical framework apply to SMI posts, but not brand posts. Hence, empirical findings for brand post-engagement cannot be generalized to SMI posts.

4 - Sending the Wrong Message: Understanding Influencers Role in the Spread of Disinformation

Roman Welden, University of Tennessee, Knoxville, TN
Leah Smith, Michael Haenlein, Kelly Hewett

While influencer marketing provides many positives for society, its popularity has also given rise to the spread of disinformation. The growing role of influencers has led to an evolution of disinformation in terms of both reach and complexity. Nearly 40% of all social media users regularly share disinformation, triggering a need to understand how disinformation messages are structured and spread. Using affect as information theory, the authors propose that the structures surrounding an influencers social network (e.g., micro vs macro influencer, connections with other influencers) interacts with message elements (emotional valence, cognitive activation, and credibility) to impact the ways in which individuals react to disinformation messages. Using a proposed multi-method approach (including sentiment analysis of Twitter posts containing disinformation, social network analysis of influencers known to spread disinformation, biometric analysis of individuals exposed to disinformation, and lab/field experiments) the authors hope to show how these messages spread and the steps marketers, regulatory agencies, and other stakeholders can take to combat disinformation.

FD04

Virtual Room 04
Retailing III
Contributed Sessions
Chair: Marco Kotschedoff
KU Leuven, Antwerp, Belgium

1 - Shopping Distancing: The Impact of Travel Cost on Shopping Destination Choices

Albert Valenti, IESE Business School, Barcelona, Spain
Victor Martinez-de-Albeniz

Travel cost is a primary factor driving consumer choice of shopping destination. We analytically formulate how changes in travel cost sensitivity affect shopping destination choices. We show that increases in the sensitivity to travel cost can lead to increases in propensity to shop for destinations that are close to the individual. Using population-wide data sets of mall visits from four cities in two countries, we show that the COVID-19 pandemic increased the travel cost sensitivity during the lockdowns between 115% and 35%, depending on the city, and between 60% and 3% during the reopening phases. Besides temporal and location heterogeneity, we show that customer characteristics and environmental factors related to individual ability to choose significantly influence travel cost sensitivity changes. Our findings shed light on the implications of urban mobility policies that affect travel costs and are relevant for retail managers to assess consumer sensitivity changes to distance.

2 - May the Workforce Be With You: Consumers' Behavioral Responses to Strike-induced Store Closures

Marco Kotschedoff, KU Leuven, Antwerp, Belgium
Liliana Kowalczyk, Els Breugelmans

Nowadays, it regularly happens that grocery chains temporary have to close (some of) their stores due to strikes of their workforce. Despite this regularity of strike-induced store closures, research on consumers' behavioral response to such closures is scarce. We investigate the impact of strike-induced store closures on consumers' shopping behavior using household scanner panel data on grocery purchases (January 2017 to December 2018) delivered by GfK Belgium to assess consumers' response to a major strike of a large grocery chain in Belgium. During this strike about 100 out of 300 stores were temporary closed. We employ a difference-in-differences analysis, where we focus on consumers who regularly shop at the affected grocery chain and compare purchase behavior of consumers in this treatment group with that of consumers in a control group that shop in a comparable, competing grocery

chain but that do not shop at the affected chain. Our results show significant evidence that consumers are less likely to shop and spend at the focal chain but more likely to shop and spend at competing chains during the strike. Interestingly, on average, the increase in spending at competing stores does not fully compensate for the decrease in spending at the focal chain, which points to a loss for the grocery sector in general. The findings of a drop in focal chain shopping incidence and spending hold even if none of the affected retailer stores in the direct proximity of the consumer were closed, albeit the effect is considerably weaker than if all or some stores in direct proximity are closed. This suggests that there is a considerable negative carry-over to stores of the chain that are not directly impacted by a closure. Furthermore, we find that drops in incidence and spending are not permanent and seem to vanish after two weeks, for the overall but also at the focal chain level.

FD05

Virtual Room 05
Data Driven Marketing II
Special Sessions
Chair: Simha Mummalaneni
University of Washington, Seattle, WA
Co-Chair: Daria Dzyabura
New Economic School, Moscow, Russian Federation

1 - Is Social Media Seeded with Polarizing News?

Hema Yoganarasimhan, University of Washington, Seattle, WA

Social media plays an important role in news consumption. We examine if and how the content of articles that users seed on social media (specifically, Facebook) differs from those sent through other electronic communications such as email. We use data from the New York Times Most Emailed and Most Shared on Facebook lists for a 2.5 year period to examine this question. We perform an LDA analysis of the corpus of articles in the two lists, and recover the top 40 topics represented in these articles. We find that the topics in the articles seeded on social media are systematically different from those emailed. Articles on topics such as Books, Animals, Food, Real-estate, Nature, and Research are more commonly sent through email. In contrast, articles on more polarizing topics such as Politicians (Donald Trump, Joe Biden), Election investigation, Vaccine, Russia, Women's rights, Pandemic, Police etc., are more likely to be posted on social media. Our results suggest that while recommendation systems used by social platforms have been blamed for promoting polarized news, the problem starts with the

content/topics being seeded into social media platforms being systematically different from the general distribution of news available or shared elsewhere. Our research highlights the role of individual users in the polarization of news content on social media platforms.

2 - Leveraging the Power of Images in Managing Product Return Rates

John R Hauser, MIT, Cambridge, MA
Daria Dzyabura, Siham El Kihal, Marat Ibragimov

In online channels, products are returned at high rates. Shipping, processing, and refurbishing are so costly that a retailer's profit is extremely sensitive to return rates. In many product categories, such as the $500 billion fashion industry, experiments in real time are not feasible because the fashion season is over before sufficient return data are observed. We demonstrate that posted fashion-item images enhance return-rate selection of assortments. We develop three interconnected models: (1) a machine-learning model to predict return rates using images and other data available prelaunch. The model predicts well; robustness tests suggest it's hard to find a better-predicting model, (2) an optimal policy to maximize profit given the imperfect predictive model, and (3) an interpretable model based on automatically-extracted image-processing features. The model provides valuable insights with which to select and design fashion items for the website. Using data from a large European retailer (over 1.2 million transactions for nearly 10,000 fashion items), we demonstrate that machine-learning methods are practical, scale to large collections and repeated fashion seasons, and improve profit relative to models using non-image data. We illustrate visually how automatically-extracted features affect return rates. Finally, we illustrate how data available postlaunch help manage return rates.

3 - Making a Smooth Exit? Menthol Bans and Cigarette Sales in Massachusetts

Simha Mummalaneni, University of Washington, Seattle, WA
Ali Goli, Pradeep Chintagunta

Many public health regulators have advocated for a ban on menthol-flavored cigarettes because they are believed to be more dangerous than traditional non-menthol cigarettes. However, these bans will have limited benefits if consumers are able to circumvent them. We examine this issue by evaluating the effects of a statewide menthol ban that was instituted by Massachusetts in 2020. An examination of store-level retail sales data from Massachusetts indicates that some demand shifted from menthols to non-menthols after the ban was instituted, thereby supporting the goals of the ban. However, broadening our analysis to neighboring states

shows a sharp increase in menthol sales in areas just outside the Massachusetts border, thereby suggesting that many Massachusetts residents were able to get around the ban by engaging in cross-state shopping for menthol cigarettes. The net result of this behavior is that the Massachusetts menthol ban reduced menthol consumption by about 50 percent and did not significantly reduce total cigarette sales. Our results demonstrate the importance of accounting for cross-state purchases when measuring the effects of menthol bans, and they also provide policymakers with guidance regarding the benefits of a national ban vs. statewide bans.

FD06

Virtual Room 06
AI and Automation
Contributed Sessions
Chair: Nina Hesel
Nuremberg Institute for Market Decisions e.V., Nuremberg, Germany

1 - When Beings Bargain with Bots

Sumon Chaudhuri, ESSEC Business School, Cergy, France
Arnaud De Bruyn

Artificial Intelligence (AI) has become an integral part of many business operations. Activities that were once thought to be exclusive to human beings are being successfully automated using AI, resulting in greater efficiency and profits. Automated CRM, adaptive FAQs, and chatbots are some examples that immediately spring to mind. An avenue that has recently garnered attention in the AI community is negotiation, with firms like RoboNegotiator gaining prominence. Given these recent developments it is crucial to understand how human beings behave when they negotiate with an AI, instead of humans, in practical scenarios. To address this question, we have developed an AI bot using supervised deep learning to replicate the behaviour of human beings in bargaining games, and simulate their behaviours in dynamic simulations. We will demonstrate a research framework to study such interactions realistically and show how it is possible to build AI agents that negotiate like humans. We then show how these agents can be trained to build super AI that beat human beings at their own game. Finally, we conclude by laying out a research agenda on human exploitability by AI and why this topic needs more academic attention moving forward.

2 - Humanoid Service Robots (HSRs) in Supporting Physician-patient Interactions: The Avatar May Need No Introduction!

Hari Ravella, Virginia Tech, Blacksburg, VA

Dipankar Chakravarti

Whereas HSRs offer potential for supporting physician-patient interactions, recent research shows that patients may show low receptivity to HSRs due to concerns such as uniqueness neglect. Moreover, receptivity may be lower if the HSR is seen as replacing or leading the human physician vs. playing a supporting role.Our research (set in a breast cancer consultation context) examines how communication style (CS: empathetic/impassive manipulated via facial expression and voice tone) drives patient responses to the physician's avatar (HSR) vs. the physician in-person. We also manipulate physician type (human/ similar avatar/ dissimilar avatar) and the patient mindset (hope/fear) about a breast cancer diagnosis. Relevant samples of adult females (from a web panel) evaluated videos of the purported interactions. In Study 1, the interaction included a preamble where the human physician introduced the avatar as an assistant, indicating that the diagnosis/treatment information would be provided on the next visit by the either the physician himself or the avatar (similar/ dissimilar). Participants then rated the interaction. Whereas mindset had no main effects on persuasion, trust, and liking, the empathetic (versus impassive) CS produced higher scores on each measure (all p's< .0001). Notably, the human physician scored higher than either avatar (all p's<.0001).Study 2 used an identical three-factor design. However, there was no preamble, and the human physician did not introduce the avatar. In this setting, both avatars scored higher than the human physician on persuasion, trust, and liking (ps <.0001). Our results suggest that patients may be receptive to avatar interactions when they are not introduced as assistants. Receptivity should improve as HSRs become common.

3 - Artificially Intelligent Marketplaces: Back-testing Trading Bots in Peer-to-peer Markets
Pavel Kireyev, INSEAD, Fontainebleau, France
Ruiqi Lin

Peer-to-peer marketplaces have become ubiquitous. Increasingly, individual actors and the platforms themselves are implementing artificially intelligent bots to buy and resell items in these marketplaces to generate profits from the transactions. However, limited evidence exists of the profitability of these attempts, with some evidence of failures (e.g., Zillow's iBuying for homes). We develop a statistical framework for back-testing trading bots in peer-to-peer marketplaces and apply the model to an emerging marketplace for nonfungible tokens (NFTs). We show that bidding bots that adopt the strategy of submitting a large number of low bids on listings and reselling at higher prices can be profitable, whereas buying bots that attempt to identify underpriced items, purchase them for their listed prices, and then resell, are unlikely to be profitable. Our

framework presents an approach to evaluate counterfactual historical outcomes in markets for illiquid items, allows for hyperparameter tuning to improve bot profitability, and can help market participants test different bot strategies.

4 - The Role of AI in Strategic Marketing Decision-making: How Will Managers Collaborate with Smart Machines - Today and Tomorrow?
Nina Hesel, Nuremberg Institute for Market Decisions, Nuremberg, Germany
Fabian Buder

With increasing data availability and computing capacity, companies are intensifying their efforts to use artificial intelligence (AI) to generate business value. Particularly in the area of marketing, there is a great potential for the use of AI. To date, AI applications in marketing practice have focused primarily on automating processes at the operational level and gaining insights from big amounts of data. However, there is a growing expectation in academia that AI has the potential to support, augment, or even replace marketing managers in strategic-level decision-making.
Previous studies indicate that managers accept to give algorithms some weight in managerial decisions, but they still want to keep a certain level of control. However, the question how such a human-machine collaboration (HMC) on a strategic level might look like remains largely unanswered. Our study addresses this lack of empirical evidence by examining managers' acceptance and future preferences regarding the weight and role of AI in strategic marketing decision-making. A five-category model is presented to evaluate the role of AI in collaboration with human managers. Based on its tasks and its level of autonomy, the role of AI can range from "no AI involved" to "Assistant", "Collaborator", "Project Manager" and "Manager". The study examines differences between concrete types of marketing decisions and between specific tasks within decision-making processes. The standardized survey study is based on a sample of 500 high-level executives (C-suite or direct reports) responsible for marketing or corporate strategy from B2C-companies on the Global Forbes 2000 list.(Study currently in field phase, results by begin of may)

FD07

Virtual Room 07
Marketing of New Technology
Special Sessions
Chair: Tong Guo
Duke University, Durham, NC
Co-Chair: Zijun (June) Shi

HKUST, Clear Water Bay, Hong Kong

1 - Does Machine Learning Amplify Pricing Errors in Housing Market?: Economics of ML Feedback Loops

Nikhil Malik, Carnegie Mellon University, Pittsburgh, PA
Platforms like Zillow offer Machine Learning algorithm (ML pricing) that predict sale prices for residential homes. These ML price models learn from observed sale prices, and simultaneously also influence those same sales. We analytically model this cyclical relationship between ML price and sale price (machine - human) called the ML feedback loop. We show that the ML price has a self-fulfilling nature which results in the ML model underestimating its own pricing error and market participants over-relying on the ML price. We show that these outcomes are more adverse when adoption of ML prices among market participants is higher. We identify market conditions in which introduction of ML pricing amplifies, instead of alleviating, erratic sale prices and makes seller payoffs worse off. We also find that sellers who are impatient, risk-neutral and have high ability to price privately - have most to gain from introduction of ML pricing. Using data from Zillow we empirically validate primitive building block of our analytical model. We find that home sale prices in 2019 had a significant 15% sensitivity to Zillow's ML price (e.g., a $10,000 perturbation in the ML price shifts the sale price by $1,500). Finally, we suggest ML design choices that could correct the feedback loop. We discuss whether platforms are incentivized to follow these corrective strategies and the role of policymakers in regulating the same.

2 - Bullet Chatting as a Double-edged Sword

Xinyu Cao, NYU Stern, New York, NY
Zuo-Jun Max Shen
Bullet chatting (also called Danmaku or bullet curtain) is a combination of video and synchronous messaging and considered to create a sense of community for the viewers. It originates from Japan and is adopted by more and more video platforms, but there is still debate about whether bullet chats enhance viewing experience and how it affects people's viewing behavior. We try to tackle this question utilizing a field experiment on a major short-video platform. The field experiment allows a randomly selected group of users to send bullet chats in an easier way. The treatment increases users' tendency to send bullet chats. We make use of this experiment design to construct an instrument variable for the number of bullet chats in a video. Using this IV, we causally estimate the impact of bullet chats on viewers' viewing and interacting behavior. We find that more bullet chats make viewers more likely to continue watching the video but less likely to interact---they become less likely to like the video or share the video. We further decompose the effect of typical bullet chat words.

3 - How to Sell Electric Vehicles?: The Impact of Direct Selling

Zijun (June) Shi, HKUST, Clear Water Bay, Hong Kong
Xubing Zhang, Ting Zhu, Mengze Shi
In the multi-trillion automobile industry, advances in hardware and software technologies are increasingly common, especially in the growing market of electric vehicles (EV); however, when it comes to how to sell the cars, innovation has been scant. In recent years, direct selling has been especially attractive to newly entering EV makers. However, in the US, the decades-old state dealer protection laws restrict automakers to selling their products only through franchised dealers. EV makers (pioneered by Tesla) have been fighting for the right to directly distribute cars to consumers. Our research addresses several questions that sparked the heated debate among managers and policy makers: how direct selling would affect the market outcome for EV and other types of vehicles, how the entry of direct selling stores affects dealers in the market, and how direct selling may affect consumer welfare. We answer these questions using causal inference methods and data provided by a major automaker in China, where there is no legal restriction on direct selling in the automobile industry. This research delivers several managerial and policy implications. First, for countries/regions that allow direct selling, our results provide empirical evidence of market outcomes of the entry of direct selling. Second, for manufacturers in countries/regions that do not allow it (e.g., many states in the U.S.), our findings shed light on whether a change in public policy is desirable. Third, for dealers, our findings can help them understand the impact of a direct-selling store thus aid their decision making on the selling efforts.

4 - Adoption of Bioengineered Food

Boya Xu, Duke University, Durham, NC
Tong Guo, Daniel Xu
We study the early-stage adoption of impossible meat, a novel food technology that synthesizes meat substitutes by closely simulating the texture, flavor, and appearance of real meat. Unlike traditional veggie meat that targets vegans and vegetarians, impossible meat attempts to attract meat lovers with minimal taste differentiation. How would this apparently artificial food product gain its success while the market demands less bio-engineered and more organic food? We document the early-stage adoption pattern of impossible meat by overcoming the common challenges in understanding adoption of bio-engineered food: 1) the new technology usually does not reach consumers before

first being adopted by intermediaries, for whom the data is often hard to obtain; 2) the documentation of the marketing antecedent of adoption decisions is incomplete and endogenous, making it hard to causally identify the driving factors behind the technology adoption. Focusing on the key players in their US market debut between 2015-2019, we construct a novel location-specific adoption metric that accurately measures the decisions of local intermediaries. To explain the adoption pattern, we analyze a comprehensive set of media corpus using Natural Language Processing. We find that local news focusing on knowledge sharing and financing of the new technology positively increases the regional adoption of impossible meat, whereas consumer WOM has little impact. We further propose the potential mechanisms for the success of the technology.

FD08

Virtual Room 08
Choice Modeling IV
Contributed Sessions
Chair: Gwen Ahn
Ross School of Business, Ann Arbor, MI

1 - Modeling Demand for Durables with Financing Option in Configurators

Tetyana Kosyakova, Frankfurt School of Finance & Management, Frankfurt, Germany
Thomas Otter, Arash Laghaie

Product configurators find application in many different industries, and companies are increasingly engaging in mass customization and offering consumers a menu of various features and options for configuring their own products and services. However, modeling demand for configured products is challenging for a number of reasons: i) the number of possible configurations (the size of the implied choice set) is large, ii) the typical configurator combines multinomial choices (e.g., the choice of a car engine) with menu choices (e.g., various optional features that in principle can be freely combined), iii) the possible configuration results span enormous price ranges (e.g., when configuring a car), and iv) configurators for high ticket items often include financing options. The resulting choice surface is both extremely high-dimensional and highly structured. We extend the model proposed in Kosyakova et al. (2020) to meet these challenges. We construct an exchange-algorithm that handles high-dimensional combinations of multinomial and menu choices that determine the final configuration (choice). In the underlying economic model of choice, we allow for two sets of liquidity constraints: one pertaining to the maximum

non-financed purchase price and one reflecting the maximum monthly payment from a financed purchase. We illustrate our model in a case study that uses configurators in a discrete choice experiment in the car category.

2 - Discrete-choice Models and Representative Consumer Theory

Joonhwi Joo, The University of Texas at Dallas, Richardson, TX
Kyeongbae Kim, Jean-Pierre H Dube

Abstract We characterize the indirect utility function corresponding to a broad class of discrete-choice additive random-utility models of individual consumer behavior with perfect substitutes preferences and divisible goods. We then link this class of models to representative consumer theory. In particular, the aggregate demand function can be derived from a single representative consumer with a class of preferences that nests the CES model depending on the assumed distribution of random utility. We also show that the representative consumer is normative, facilitating aggregate welfare analysis for this same broad class of models. This linkage hinges on the divisibility of products. When products are indivisible, we show that integrability fails, indicating the lack of a representative consumer formulation for the pure discrete-choice model of demand. These findings should be of interest to the literatures in macro, trade and labor economics that use representative consumer models such as CES and its variants, insofar as the functional form assumption can be shown to be consistent with an empirically-relevant class of models of behavior that are routinely used in the discrete-choice analysis of micro data.

3 - Leveraging Thick Descriptions to Customize Bundles for Experiential Goods: An Application to Performing Arts Subscriptions

Gwen (Geun Hae) Ahn, University of Michigan, Ann Arbor, MI
Eric Schwartz, Fred M Feinberg

Many companies offer curated product bundles with multiple components, like meal kits, wines, sports packages, and arts performances. Customizable bundles allow consumers willing to precommit to a purchase of a minimum size to freely pick their bundle's component items. While offering flexibility, this imposes a substantial cognitive burden for the consumer, as the space of possible bundles quickly grows prohibitively (e.g., over 2 million possible bundles of five for a 50-item assortment). This burden is exacerbated when the component items are experiential (e.g., theater performances), and not obviously comparable to items from past seasons. To help consumers navigate this complexity, firms need to make

recommendations that balance consumers' idiosyncratic preferences with their (potential) desire for within-bundle variety, even for items that have never been offered before. Here, we leverage consumers' choices of customized performing arts bundles to inform a novel model that captures heterogeneous trade-offs between performance attribute preferences and bundle-level variety. Instead of relying exclusively on pre-defined genres (e.g., dance, orchestra, etc.), we use textual analysis of consumer-facing brochure descriptions. This provides attributes (latent topics) enabling utility for "new" performances to be projected into future seasons. These rich attributes in turn allow the construction of a wide range of variety metrics to heterogeneously measure consumers' marginal value for bundle variety. Such holistic bundle variety measures improve the model's predictive performance over one that only accounts for a priori performance "genres", the identification of those consumers who do value bundle variety, as well as enabling superior recommendations individually and across the consumer pool.

FD09

Virtual Room 09
Information Goods and Content
Contributed Sessions
Chair: Chutian Wang
University of Maryland, Hyattsville, MD

1 - Effects of Competition on Ad Content

Leonie Gehrmann, University of Mannheim, Mannheim, Germany
Stefan Kluge, Florian Stahl

The impact of competition on various aspects of firm behavior in general and on advertising strategy in particular has been heavily investigated. For instance, existing literature streams explore advertising timing, determining that ad pulsing in-sync with competitors is a dominant and profitable form of advertising incidence. A substantial body of literature also explores the relative usage of persuasive and informative advertising. The nature of differentiation has been shown to determine which approach is more helpful to attract consumers in the competitive market. However, little empirical research has been performed to compare competitors' ad strategies beyond timing.

This study assesses how the type of competition in a market affects advertising content and design of print advertisements. More specifically, this study considers the role of competition intensity and analyzes both the timing and content of advertising campaigns of firms competing in the same product market. We derive various managerial implications to be considered when defining an advertising strategy.

2 - Does Behavioral Targeting Hurt Brands? The Effect of Third-party Data Sharing on Brand Attitudes

Ngan Vo, PhD Candidate, University of Manitoba, Winnipeg, MB, Canada
Rajesh V. Manchanda

Behavioral targeting has become a dominant approach to target consumers in the digital economy. This marketing practice has accelerated thanks to technological advances that constantly monitor consumer behavior (e.g., through search data, browsing history, voice recognition) and via unauthorized data sharing practices among firms. Although some work has suggested that behavioral targeting benefits firms (e.g., improving consumers' response to advertisements, improving performance of communication), this stream of research has largely assumed that consumers were unaware of such practices. Today such naivety is, however, rare. In fact, consumers feel strongly about their information privacy: 55.8 % of consumers feel the loss of their privacy and favor the enactment of strong information privacy laws, up from 26% in Westin's 2000 study. In this research, we provide more evidence for the downside of behavioral targeting practices. Through two studies, we find that behavioral targeting in which third-party data sharing practice were made more salient was detrimental to both focal and affiliated brands. Specifically, controlling for pre-brand attitudes, consumers in the behavioral targeting condition (vs. control condition) reported less favorable brand attitudes towards both focal and affiliated brands. This effect was mediated by an increase in consumers' perception of creepiness following a behavioral targeting practice. We also found evidence for the moderating role of individuals' level of privacy knowledge, which has been understudied in privacy research. Specifically, the indirect effect was significant among those who have moderate and high level of privacy knowledge, but insignificant among those who have low level of privacy knowledge.

3 - The Accuracy of News

Chutian Wang, Unviersity of Maryland, College Park, MD
Bo Zhou, Yogesh V Joshi

News consumers are seeking information and updating their beliefs about the true state of the world which is random in nature. While news does not always accurately reflect the truth, it can help consumers reduce their uncertainty about the true state of the world, and thus increases their expected utility. The accuracy of news influences consumers'

willingness to pay and depends on the production cost for the media firm. We model a media firm's news provision strategy as well as consumers' news consumption decisions. We find that consumers value news more under higher prior uncertainty. If investigation and reporting are of low costs, the media firm offers news with full accuracy. As news reporting becomes more costly, news provision will be profitable only when consumers' prior belief is not too extreme so that they see enough value in news. Although consumers seek the truth, the cost of news provision can still lead to reporting inaccuracy. In particular, the media firm would allocate more resources on accurately reporting the state which is more likely a priori to increase its probability of presenting the truth. In equilibrium, such allocation of resources will result in an exaggeration of the likelihood of the more likely state a priori. We extend the model to study the impact of polarization in consumers' prior beliefs on news accuracy. We find that polarization makes reporting less accurate when the cost of news provision is moderate, but has no impact when the cost is low or high. The reason is that although polarization decreases the firm's incentive to provide accurate reporting, the significance of its impact varies across cost levels. Interestingly, polarization can make news reporting more accurate when the media firm cares not only about earning profits but also about improving consumers' probability of being correct about the truth. Polarization means consumers initially show less interest in learning from news, which then incentivizes the firm to attract consumers with more accurate reporting.

FD10

Virtual Room 10
Politics, Ideology and Identity in Marketing
Special Sessions
Chair: Andrew Ching
Johns Hopkins University, Baltimore, MD
Co-Chair: Z. Jessie Liu
Johns Hopkins University, Baltimore, MD

1 - Impact of Market Structure on Regulatory Compliance: Evidence from Online Censorship in China
Z. Jessie Liu, Johns Hopkins University, Baltimore, MD
This paper studies the role of market structure in regulatory compliance through a unique empirical example: censorship via content removal by three major live-streaming platforms in China. Based on 30 unexpected sensitive events, I first present reduced-form evidence that the largest platform censored a higher number of keywords and complied faster

on average than the smaller platforms. I then develop and estimate a structural model where platforms compete for users by choosing whether to comply with the government's censorship requests. By complying immediately, platforms may lose users who prefer to evade censorship by switching out. By delaying compliance, platforms incur a political cost but it also allows them to attract new users from their competitors who quickly comply with the government's censorship requests. My counterfactual analysis predicts that centralizing market power via merging or shutting down small platforms could backfire and lead to a lower scope of censorship.

2 - Spilling the Beans on Political Consumerism: Do Social Media Boycotts and Buycotts Translate to Real Sales Impact?
Jurate Liaukonyte, Cornell University, Ithaca, NY
Brands increasingly face pressure from consumers to take a stance on political issues, but there is limited empirical evidence about the effect of political consumerism on sales. In this paper, we quantify the consequences of a brand taking a political stance. In July 2020, the CEO of Goya, a large Latin food brand, publicly praised President Trump, triggering a boycott movement and a counter buycott movement supporting the brand. Using consumer-level purchase data, we measure the net effect of the boycott/buycott movements on brand sales. Boycott-related social media posts and media coverage dominated buycott ones, but the sales impact was the opposite: the buycott dominated the boycott, temporarily leading to a 22% increase in Goya sales. However, this sales boost fully dissipated within three weeks. We then explore heterogeneity in the sales response with the goal of understanding which households are most likely to engage in political consumerism. We find evidence of large sales increases (56.4%) in heavily Republican counties but do not find a strong countervailing boycott effect in heavily Democratic counties. Finally, we show that Latino consumers, who make up Goya's core customer base and who tend to skew Democratic, did not significantly reduce their purchases.

3 - Consumption Responses to an Unpopular Policy: Evidence from a Short-lived Soda Tax
Andrew Ching, Johns Hopkins University, Baltimore, MD
Public policies that intervene or restrict consumer choices for the benefit of society are often controversial. For instance, the compliance rate of COVID-19 pandemic social distancing rules varied dramatically across cities and states, and these policies even backfired among some consumers who strongly disagreed with them. Motivated by these controversies, we investigate whether such rebellion behavior happens in the context of a soda tax. More specifically, we hypothesize that

tax opponents will decrease their consumption of soda by more compared to tax supporters, in order to avoid the tax burden. We combine detailed voting records with price and quantity data at over a thousand grocery retailers, and show that in response to the short-lived Washington State soda tax, stores frequented by tax opponents experience twice the reduction in quantity sold of taxed beverages compared to stores frequented by tax supporters, even though the tax pass-through is uniform across all stores. Our estimation results show that demand for soda at tax opponents' stores shifts inwards and becomes less elastic, supporting the behavioral interpretation that consumer disagreement with this policy induces tax avoidance.

4 - Designing Inclusive Platforms

Michael Luca, Harvard Business School, Boston, MA
Abhay Aneja, Oren Reshef

Online platforms have come to play a central role in the economy, helping to facilitate a large share of economic activity. In this paper, we explore the impact of a feature on a large online platform that allows users to observe the race/ethnicity of minority-owned businesses. In principle, revealing private user information, such as race, has the potential to either contribute to inclusivity or exacerbate discrimination on the platform. Empirically, we find that the addition of this feature substantially increased demand for minority-owned businesses on the platform. We provide suggestive evidence that the effects are larger in predominately white, higher income, and democratic-leaning areas; and that the increase in demand is driven mostly by non-minority users. Overall, our results highlight consumer preferences for supporting minority owned businesses, and suggest that platforms can in some cases increase demand for minority owned businesses by making the ethnicity of minority owners more salient.

FD11

Virtual Room 11
Marketing Strategy and Finance
Contributed Sessions
Chair: Kyeongbin Kim
Emory University, Atlanta,

1 - Seller-initiated Consumer Financing and Consumer Sales-finance Conflicts

Chenchen Di, University of Illinois at Urbana-Champaign, Champaign, IL
Yunchuan Liu

In this paper, we study the conflicts between sales divisions and consumer finance divisions in firms when firms not only sell their products, but also provide financing to consumers. We design a game-theoretical model to study the interdependence and the conflict between the sales division and the consumer finance division within a firm and how intrafirm sales-finance conflicts affect the interfirm competition on both pricing and consumer financing. While conventional wisdom suggests that a centralized structure without divisional conflicts would benefit the firm, we show that in a competitive market, a decentralized firm where the sales and consumer finance divisions make price and financing decisions separately can benefit from the conflicts between the sales and consumer finance divisions and gain more profits than a centralized firm without sales-finance conflicts. In addition, when competing firms can decide their organizational structure endogenously, in contrast to the monopoly market where firms always choose a centralized structure without conflicts, competing firms in a duopoly market, surprisingly, may choose a decentralized structure to strategically invoke the conflicts between the sales and consumer finance divisions.

2 - Retailer-direct Financing and Channel Structures

Yuyang Zhao, Nanjing University of Science and Technology, Nanjing, China
Luying Wang, Yunchuan Liu, Hui Yang

We study the effect of retailer-direct financing on channel structure choice when a retailer can provide sales promotion service. A capital-constrained supplier can receive financial support from a capital-abundant retailer for production and sell products through the retailer's agency channel, reselling channel, or both channels. The retailer can decide the channel structures and provide corresponding sales promotion services to increase the demand with an effort. We design a game-theoretic model to explore the impact of the strategic interaction between retailer and supplier on channel structure choice by considering the retailer's financial service and sales promotion service. Counter-intuitively, we find a reselling channel could be more efficient than a reselling-agency dual-channel even the commission rate in the agency selling or the cost of the sales effort on providing promotion service is high. The retailer could prevent the supplier from free-riding the retailer's effort by designing a contract with financial support, and therefore double-marginalization effect could be mitigated as well. Our study provides new insights into the channel structure choice with the interface between supply chain finance and marketing promotion.

3 - Variety Matters: How Consumption Variety Affects Debt and Repayment Behavior

Xiaodan Zhang, University of Science and Technology Beijing, Beijing, China
Maiju Guo

The fast development of digital technology allows companies to access new sources to understand consumers and map out an outcome. Prior research has investigated how the classification of consumer purchases influences borrowing preferences, for example, identifying the physical longevity of purchases or experiential purchases as the drivers of debt decisions. However, whether and how the pattern of purchase influences consumers' debt and repayment behavior remains an open question. This paper explores the influence of one pattern of consumer purchase, i.e., variety-seeking, on their subsequent debt and repayment behavior. Using a novel purchase record dataset from a large e-commerce platform, we construct a measure of consumption variety through the text analysis method. We assemble the consumption dataset with another dataset from a third-party lending platform based on the identifiable user id. Our empirical analysis suggests that consumers' consumption variety substantially influences loan amount and default rate in the future. Specifically, we find that when consumers are more willing to seek variety, they are more likely to borrow more, and less likely to default. Moreover, we find that gender, hedonic purchase, the repayment plan (day vs. month), and the number of loan history moderate the interrelationship between consumption variety and the future debt and repayment behavior. This paper contributes to the literature linking consumer consumption behaviors to financial decision-making. Our findings shed important managerial insights on companies, which can utilize variety as an effective predictor of targeting and customer management.

4 - Deep Learning Methods for Customer-based Corporate Valuation: Evidence from 1000 Companies Over 6 Years

Kyeongbin Kim, Goizueta Business School, Emory University, Atlanta, GA
Daniel McCarthy, Dokyun Lee

A canonical problem within the empirical CRM literature is to predict future customer purchase activity using historical behavioral data, with customer-based corporate valuation (CBCV) generalizing this problem across behaviors and customers to revenue at the overall company level. Common wisdom within these literature streams is that modern machine learning methods may outperform traditional parametric models at the individual-level over short forecasting horizons, but lack interpretability and underperform at the aggregate level, especially over longer horizons, making such methods unsuitable for these use cases. Using a novel credit card panel dataset for 1,000 companies over a 6-year period, we show that common wisdom had indeed been true historically. However, through a one-of-a-kind meta-analysis, we show that a subset of time series deep learning methods, when optimized for CRM settings, robustly outperform extant models in CBCV settings assuming only internal data (for inside-out analyses) or external data (for outside-in analyses) are available, over short and long time horizons. We also show that the proposed method predicts company-disclosed revenue data better than Wall Street analysts, further establishing its value in CBCV settings.

FD12

Virtual Room 12
Networks and Word-of-Mouth
Contributed Sessions
Chair: Shyam Gopinath
Indiana University Kelley School of Business, Bloomington, IN

1 - How Do Brand Networks Break in Face of a Crisis?

Martina Pocchiari, Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands
Pinar Yildirim, Abdullah Almaatouq

Customers rely on brand communities to interact with each other, to connect with the brands they love, to solve problems, and to personalize their consumption experiences. However, customers also resort to brand communities to coordinate a negative collective crisis response. An uncontrolled reaction of online brand communities to brand crises can deteriorate brands' value and market performance, and push loyal and engaged consumers away from the brand networks. In this project, we assess the effect of brand crises on customer participation in online brand communities, and on ease and speed of information spread in the brand networks. We use data from 300 online brand communities, and exploit the quasi-experimental exposure of community members to over 7000 brand crisis episodes reported by news providers between 2010 and 2019. In a series of difference-in-difference analyses, we find that brand crises (i) increase the weekly participation of consumers in brand communities, (ii) affect the patterns of information-sharing in the brand networks, and (iii) have a differential impact on different consumer types. In particular, brand-loyal consumers effectively disengage from their brand communities following the crisis event - therefore, the average boost in consumer

activity is attributable to brand strangers, who only activate after a crisis. We also show that the decrease in community engagement is mitigated among the brand-loyal consumers who had proportionally more experience, loyalty, or status within the brand community. Accordingly, we suggest that brand crises are a serious threat to the integrity of online brand communities, but that consumer loyalty and commitment can potentially preserve the functioning of brand networks online in case of serious reputation threats. The insights from this paper support businesses and organizations managing online communities in situations of external stress and unexpected reputational threats.

2 - Should Firms Reward Referring Customers Based on the Performance of Each Referred Customer?

Yupeng Chen, Assistant Professor of Marketing, Nanyang Technological University, Singapore
Bowen Lou

Referral programs have been widely adopted by firms for new customer acquisition. In most referral programs, the reward that a referring customer receives is only contingent on the acquisition of each of his referred customers. While such an acquisition-based referral reward provides current customers an incentive to make referrals, it may not be effective in generating referrals that acquire high-value new customers. To improve the outcomes of referral programs, we propose that firms can consider rewarding a referring customer based on the short-term performance of each of his referred customers, in addition to offering the standard acquisition-based referral reward. We empirically tested the effect of our proposed performance-based referral reward by conducting a large-scale randomized field experiment in collaboration with a Chinese online financial services firm. Analyzing data from the experiment, we find that offering a moderate performance-based referral reward increased the total value of new customers acquired through the referral program by more than 110%, and this effect is primarily driven by the acquisition of higher-value new customers instead of more new customers. We propose two mechanisms to explain how the performance-based referral reward helped the firm acquire higher-value new customers, including (1) by motivating current customers to screen their friends and refer good matches to the firm, and (2) by offering referred customers an additional incentive to invest. The data provide support for both mechanisms.

3 - Behind the Badge: The Influence of Badged Reviewer Status and Emotional-cognitive Writing Style on Opinion About Hedonic and Utilitarian Products

Shyam Gopinath, Indiana University Kelley School of Business, Bloomington, IN
Elham Yazdani, Steve Carson

In this research we examine the role of reviewer badges in the spread of opinion in online reviewer communities. Using data covering a two-year period of 458,305 reviews for products in both hedonic and utilitarian categories on Amazon.com, we find that prior ratings from badged reviewers have a smaller influence across all reviewers than ratings from non-badged reviewers. When distinguishing between badged and non-badged new reviewers, we find that ratings from badged reviewers have an inverse effect on ratings awarded by subsequent non-badged reviewers whereas ratings from non-badged reviewers positively influence subsequent ratings from all reviewers. The stronger influence of non-badged reviewers is particularly pronounced for hedonic products, reflecting a better fit with the emotional style in which they are shown to write and the fact that they alter their writing style more when reviewing hedonic products than badged reviewers do. In contrast, ratings from badged reviewers have a positive effect only on the opinions of subsequent badged reviewers and this within-group contagion is especially strong for utilitarian products. Implications for the design of influencer strategies and the study of individual review generation processes are discussed.

FD13

Virtual Room 13
Social Media and UGC
Contributed Sessions
Chair: Ning Zhong
Penn State University, University Park, PA

1 - Peer Effects on Brand Activism: Evidence from Brand and User Chatter on Twitter

Mithila Guha, Drexel University, Philadelphia, PA
Daniel Korschun

The research examines a brand's decision to engage in sociopolitical activism and how the recent activism of other brands influences such participation on social media. By analyzing five years of brands' tweets on three sociopolitical issues (Black Lives Matter, LGBTQ rights, and COVID-19 policies), we find evidence that brands are more likely to tweet on a topic the more other brands have tweeted on it recently. In addition, brands are equally attentive to the activism of peers outside their industry as they are to competitors inside their industry. To shed light on the interactions between brands in the non-market domain of activism, we connect three distinct areas of brand-focused

literature: peer influence, social media interactions, and brand activism. While much of the literature on online interactions focus on either firm- or user-generated content, this paper examines both to capture a more dynamic interplay between brands social media users. We analyzed over 423,000 brand tweets (4,505 of which are on one of the three focal issues), 55,121 user replies to the activist tweets, and 87,254 Twitter mentions of brands by consumers during the timeline. In addition, we propose a novel way to quantify the theoretical concept of increased stakeholder expectations on brands to address divisive issues by using Twitter mentions and hashtags. Furthermore, this research stands in contrast with the current brand activism literature, which frequently focuses on analyzing the impact of activism on a brand's own market performance or influencing stakeholders' behavior. Instead, our approach broadens the conversation and elucidates how brand activism may influence the decisions of its peers. We argue that while brands monitor and imitate peer brands' market strategies in conflicting situations, such behavior may also be reflected in brands' non-market strategies, such as taking a stand on a divisive issue. Overall, our findings provide evidence that brand managers monitor peer and consumer social media activities to weigh the risks of taking a stand and the risks of staying silent on an issue.

2 - Content Creation, Monetary Rewards, and Risk: How Creators Learn to be Creative

Wensi Zhang, University of Southern California, Los Angeles, CA

Sha Yang, Yanhao Wei

What motivates content creators to explore a new content genre as opposed to exploiting familiar contents? This paper examines the effects of monetary rewards and risk and posits that a lower level of monetary rewards with less volatility encourages exploration by reducing the opportunity costs of tapping into a new genre. Using a novel data source from a live streaming platform, we find that the decrease in platform-level monetary reward and reward volatility during the COVID-19 lockdown indeed promotes creators' willingness to explore. To gain more insights into the mechanism, we build and estimate a structural model where creators face uncertainty in their monetary reward from producing each content genre and update their belief through their past creation and consumption experience. As such, our model allows us to study how platform policies affect creators' content choice and their tendency to explore new content.

3 - The Power of Linguistic Similarity in Q&A Communities

Hui Cai, Zhongnan University of Economics and Law, Wuhan, China

Yaxuan Ran

Q&A communities have become one of the most common approaches for people to get information and exchange ideas. Users pose questions, contribute answers, evaluate answers submitted by others and retrieve existing question-answer pairs for immediate information need. A question may receive many good answers from other users, but not all of them can be accepted by the question-asker or voted up to be the best by other viewers. What factors contribute to the answers that are highly valued by fellow community participants? Except for inherent features of answers, features associated with interactivity between question-answer pairs, such as linguistic similarity, can be effective in predicting the votes of answers. Drawing on similarity theories, we classify three types of linguistic similarity: sentiment, discourse and attribute similarities. We investigate the divergent effects of linguistic similarity between question-answer pairs on the answer score using a dataset from the large Stack Exchange Q&A community. We first use text mining techniques to extract the sentiment, discourse and attribute similarity properties of 34457 question-answer pairs posted from 2012 to 2021. Generalized linear model shows that a stronger trend of sentiment, discourse and attribute similarities leads to higher answer score; in other words, like-minded community members are more inclined to value text content of homophily. However, the strength of this effect is divergent across female and male answerers, such that for answers written by female users, sentiment similarity is stronger in predicting answer quality score, while attribute similarity plays a more important role for answers written by male users. The result provides evidence of gender bias in the Q&A community. We further show the causality of the result with an experiment by leveraging the question-answer pairs randomly selected from our text corpus. Given the importance and prevalence of knowledge sharing, our findings have important implications for online question answering communities to better manage user generated content.

4 - Measuring Impact of Social Media Influencers with Textual Content

Ning Zhong, Penn State University, University Park, PA

Xin Yan

In addition to engaging consumers with company-owned social media accounts, brands are collaborating with influencers and creators on social media to reach a wider audience, increase brand awareness, and boost traffic. Although the total spending of influencer marketing in the is estimated to have reached 3.7 billion dollars in 2021, making decisions on which influencers to hire and how to use these influencers to promote brands on social media is still a challenge in practice. In this research, we propose a deep learning model to measure the impacts of social media

influencers based on the textual content that they contribute and its popularity. Our results show that influencers have different impact on different fields of online opinions in regard to social media metrics. With this approach, marketers are able to quantify the impact of influencers in each field and optimize resource allocation in hiring influencers to promote brands in the related fields.

FD14

Virtual Room 14
Text, Digitization, and NLP II
Contributed Sessions
Chair: Michal Herzenstein
University of Delaware, Newark, DE

1 - Online Managerial Response Strategies Toward Customer Reviews: The Elaboration Likelihood Model, Emotion Contagion and Emotional Regulation Perspectives

Hsiu-Yu Hung, National Taiwan Normal University, Taipei, Taiwan

Previous research has focused on exploring whether and how managerial responses (MRs) influence subsequent customer reviews (CRs) but there is no theoretically comprehensive framework for the interdependent relationships between MRs and previous/later CRs, or the dynamic influences of MRs on future CRs. To address this issue, this research integrates the elaboration likelihood model (ELM) with emotional contagion and regulation theories to depict the bilateral communication between firms and previous/subsequent customers in online settings. The author proposes a central route and two peripheral routes to depict the persuasion effects between previous and subsequent consumers' CRs. The central route describes how previous customers' numeric rating scores influence later customers' rating scores through the mediator of cognitive process. The peripheral routes describe how previous customers' positive/negative emotions will influence later customers' positive/negative emotions; these can be moderated by eight MR strategic tools designed to regulate positive and negative emotions. The author collects text from customers' reviews and managers' responses on TripAdvisor using text-mining techniques to transform unstructured text data into focal variables, and analyze their temporally interdependent effects using VAR modeling. The author then examines the specific mediating effects on one central and two peripheral routes, as well as the different moderating effects of MR strategies on the regulation of customers' emotional contagions. The empirical results support the proposed research propositions and hypotheses. Empirical

findings not only enrich the theoretical underpinnings for CR/MR literature but also provide clearer understanding of the online bilateral communication mechanisms between firm and customers and managerial guidance for how customers' emotional contagions might be regulated.

2 - Online Review Text Analysis Incorporating Valence and Vote: Extending the Topic Model to Include Performance Measures

Sotaro Katsumata, Osaka University, Toyonaka, Osaka, Japan
Pallassana K Kannan

In this study, we developed a model to classify and evaluate the topics of online reviews by including not only the text of the review but also the products' valence (evaluation score), which is given from multiple perspectives by reviewers, and the votes of other viewers that the review was helpful. Regarding valence and vote, several studies have presented models to analyze valence and text simultaneously, but to make effective use of CGM data, it is necessary to consider the information of vote, which is the quality of the review itself, together. Therefore, in this study, we present a topic model including valence and vote mentioned above in the text analysis of consumer reviews and adapt it to long-term review data. Especially, we aim to develop a model that can be estimated as stably as possible using LDA (latent Dirichlet allocation) as the base model. Our model is based on the LDA, but a conjugate distribution is assumed for the review scores and the number of votes to obtain stable estimation results. The model is applied to an actual review database. As objects of analysis, this study focuses on two product series, the iPhone series manufactured by Apple Inc, and Dyson's handheld vacuum cleaner series. In the application to the actual review database, we confirmed that topics can be interpreted by referring to valence and vote in the evaluation of topics after classification. In addition, we estimated and discussed the factors that determine the probability of affiliation for topics that attract many viewers.

3 - The Language of (non)Replicability

Michal Herzenstein, University of Delaware, Newark, DE
Sanjana Rosario, Shin Oblander, Oded Netzer

We explore whether the language used by scholars in academic publications is predictive of whether the main findings in the paper are replicable. We build on past research showing that written words carry information beyond their literal meaning in interpersonal and formal communications, and even when the text is written and edited by multiple people. We join the emerging movement towards Open Science that aims to increase the openness, integrity, and reproducibility of scholarly research. So far,

replication attempts of hundreds of papers in psychology and economics demonstrate that less than half of the findings are replicable. We attempt to predict the replicability of nearly 300 Open Science pre-registered replications by focusing on the language used in the replicated papers. Controlling for a large set of metadata variables from the papers being replicated, including authors' information, academic domain, and study-specific information such as sample and effects sizes, we find that the text used to describe the experiment being replicated improves predictions of replicability by over 4% (AUC with textual data = 0.734 versus, AUC without textual data = 0.705). This result holds in multiple robustness tests. Turning to interpretability, we find that replicable studies are often easier to read and include more quantitative and function words, while non-replicable studies are written with more clout and include more positive emotion words. Overall, we find that consciously or unconsciously, knowingly or unknowingly, researchers' language usage alludes to their research replicability likelihood.

Saturday, 9–10am

SA01

Virtual Room 01
Theoretical Advances in New Product Development and Innovation
Special Sessions
Chair: Onesun Steve Yoo
University College London, London, United Kingdom
Co-Chair: K Sudhir
Yale School of Management, New Haven, CT

1 - Consumer Guilt and Sustainable Choice: Environmental Impact of Durable Goods Innovation
K Sudhir, Yale School of Management, New Haven, CT
Ramesh Shankar, Yuan Jin
The paper develops a modeling framework to study how sustainability interventions impact consumer adoption of durable goods innovation, firm profit and environmental outcomes in equilibrium. Our two period model with forward looking consumers and a monopoly firm introducing an innovation in the second period accommodates three key features: (1) it builds on the psychology literature linking reactive and anticipatory guilt to consumers' environmental sensitivity on initial purchase and upgrade decisions; (2) it disentangles environmental harm over the product life into that arising from product use and dumping at replacement;

and (3) it clarifies how a taxonomy of innovations (function, fashion and use-efficiency) differ in how they provide value and cause environmental harm during use and dumping. Given how guilt impacts environmental sensitivity, the model allows for owners upgrading a product to be more environmentally sensitive than first time buyers; this makes dumping harm and in-use harm from products not fungible. We find that with fashion and function innovations, increasing consumer sensitivity to environmental harm can surprisingly result in increased environmental harm. Further, when consumers are very sensitive to environmental harm, firms will not inform (pre-announce to) consumers about the impending arrival of use-efficiency innovation; to minimize environmental harm, a sustainability advocate needs to inform consumers. Thus, contrary to conventional wisdom, consumer environmental sensitivity does not always substitute for the role of sustainability advocates. Our results clarify how to design win-win policies for firms and the environment; and when advocates have complementary/adversarial roles relative to firms to achieve sustainability goals.

2 - Regulating Environmental Impacts from Planned Obsolescence
Man Xie, Arizona State University, Tempe, AZ
Tianxin Zou
Many firms exercise planned obsolescence, deliberately reducing product durability to encourage new product purchases in the future, which generates unnecessary wastes and environmental damages. Policymakers have attempted to address the problem with several methods, including charging environmental taxes, investing in reducing product environmental footprints, educating consumers' environmental awareness, etc. Our paper analyzes how the regulation influences the firm's planned obsolescence decisions, the environmental damage, and the social welfare. We show that the regulations can sometimes unintendedly exacerbate the level of planned obsolescence, which can potentially harm the society.

3 - Product Development using Lean Startup Method: The Effect of Entrepreneur Incentives
Onesun Steve Yoo, University College London, London, United Kingdom
K Sudhir
The lean startup method (LSM) advocates an iterative and adaptive approach to product development based on launching a minimum viable product (MVP) to receive feedback about product-market fit and responsively pivoting its product goals. To achieve the intended learning, LSM suggests that an MVP be designed so that, when launched,

the false positives (wrong product generating high sales) and false negatives (right product generating low sales) in the market response are minimized. But this does not reflect real world product development choices as it does not account for entrepreneurial incentives, i.e., how product choices impact the entrepreneur's payoffs. Entrepreneurs not only care about their learning from product development outcomes, but also how it would impact the project's potential funding and their share of eventual payoffs. Moreover, since entrepreneur's observable talent impacts the payoff from a successful venture and their alternative earning options, product development choices vary across entrepreneurs. Employing a stylized model of LSM with entrepreneur's incentives, we investigate the entrepreneur's implementation of LSM and its broader implication to innovation. We find that entrepreneurs with low observable talent launch products that has higher false positive rates (hurts learning) relative to the standard LSM MVP. In contrast, those with high observable talent launch products with low false positive rates (hurts sales and therefore chance of funding) relative to the MVP. Only those with moderate levels of observable talent introduce the standard MVP that maximizes learning as intended by LSM. Despite their product distortion relative to the standard LSM MVP, entrepreneurs with high observable talent (and high outside option) are the least likely to fail after fundraising, and thus investors obtain the highest ROI, though they launch fewer innovations overall. However, those with moderate levels of talent provide the best balance between volume of innovation and overall ROI.

SA04

Virtual Room 04
Retail and Omnichannel
Contributed Sessions
Chair: Yutian Liu
University of Wisconsin-Madison

1 - Empirical Dynamic Modelling for Exploring Complex Time Series

Florian Dost, *Brandenburg University of Technology, Cottbus, German*
Erik Maier, Tammo Bijmolt

Many research problems are characterized by complex relationships between time series variables, such as simultaneity (e.g., feedback loops between communication channels) and state-dependence (e.g., marketing interactions with observed and unobserved sales channel variables). We introduce empirical dynamic models (EDM) to management science and marketing research. EDM is a nonlinear methodology that helps researchers to investigate simultaneous (i.e., bidirectional and same-period) and state-dependent (i.e., nonlinear and interacting) relationships with aggregate time series data. The authors demonstrate EDM capabilities and boundaries within the challenging omnichannel case. To study omnichannel systems, researchers often must rely on aggregate data: Despite more individual tracking, the data is often not available for offline channels or comprehensively integrated across channels. A simulation study, that derives aggregate time series from an individual data generation mechanism, explores conditions and boundaries under which EDM is suitable for identifying relationships between variables (i.e. in the Granger sense), predicting variable evolution (i.e. in the Machine Learning sense), and attributing marginal effects from one variable on another (i.e. in the Neyman-Rubin sense). We benchmark EDM against vector autoregression, regression, and machine learning models and provide application criteria for EDM. Next, we confirm the capabilities of EDM in an empirical investigation of interrelated brick-and-mortar, online, and mobile channels from a large European fashion retailer, finding evidence for mostly synergetic but strongly state-dependent relationships among the channels.

2 - Adoption of Mobile Self-checkout in a Retail Store

Aashish Pandey, *University of Arkansas, Fayetteville, AR*
Dinesh K Gauri, Yu Ma, Rupinder Jindal

Retailers are incorporating different technologies in their stores to make the shopping experience enjoyable and reduce friction. One such technology - mobile checkout is increasingly becoming popular among retailers. In mobile checkout, consumers scan items while they shop from their phone using the retailer's app and check out quickly without unloading-loading their cart. We study different shopping characteristics and user characteristics to explain the trial and repeat usage of mobile checkout using store transaction data from a major US retailer. We found that transaction characteristics such as total spending, item price, basket share of groceries, electronics, and consumer characteristics such as prior usage of self-checkout, time pressure, tenure, and trial frequency are significant predictors of trial and repeat mobile checkout usage. We further identify three natural groups of customers who try and adopt mobile checkout differently. Our findings have profound implications for how retailers can enhance the customer shopping experience through optimal allocation of resources to serve different segments of customers.

3 - Leaving Money on their Smartphones: Comparing uses of Promotional Codes Between Mobile and PC Shoppers

Rebecca Jen-Hui Wang, Lehigh University, Bethlehem, PA
, Mathew Isaac

Are customers more or less likely to use promotional coupon codes when they shop with their smartphones? In an e-commerce setting, a retailer can offer customers discounts that require them to input a promotional coupon code upon checking out and transacting the order, e.g., enter 5OffHolidays for $5 off. In this multi-method paper, we examine whether customers use coupon codes when they shop online using smartphones compared to when they use devices with larger screens, such as PCs. We first empirically perform a series of analyses using causal inference, machine learning, and econometric models with a large proprietary dataset from an Internet-based grocery retailer. We find that customers are more likely to use coupon codes when they shop using PCs as opposed to smartphones. We replicate the findings in a more controlled setting with two experiments, and we posit that customers are less likely to enter promotional codes while shopping on smartphones because perceived search effort is higher when operating on a small screen. Combining primary and secondary research, we make contributions in both retail and mobile marketing literature. Conceptually, we propose that search effort and perceived cognitive load play an essential role in uses of online coupons. Managerially, we recommend that an online retailer should tailor different types of promotional offerings depending on its customers' channel preference.

4 - Are Pop-up Stores Popping up to Attract Traffic and Sales: An Empirical Examination of the Causal Impact at Both Mall and Store Levels

Yutian (Carol) Liu, University of Wisconsin-Madison, Madison, WI
Cheng He, Qing Liu

As the young generation shifts their consumption habits towards online shopping while traditional brick-and-mortars are losing their competitive powers in attracting traffic, pop-up stores, as a new modality of retailing, are becoming more appealing to mall owners and landlords of commercial districts. These temporary, strategically planned physical retail spaces serve as an important mix of omnichannel marketing strategy and have shown their success with delivering personalized brand experiences, expanding current markets, and building up connections in marketing practices. This paper empirically examines the causal impact of pop-up stores on the traffic and sales at mall and store levels by leveraging a unique data set from 100 shopping malls in China. The temporal and spatial substitutional effects, as well as heterogeneous effects regarding types, timing, and locations of pop-up stores, are also discussed.

SA05

Virtual Room 05
Internet E-Commerce
Contributed Sessions
Chair: R Venkatesh
University of Pittsburgh, Pittsburgh, PA

1 - Fewer Clicks, More Purchases

Murat Unal, Cornell University, Ithaca, NY
Young-Hoon Park

E-commerce retailers are increasingly faced with the challenges of finding ways to provide a seamless shopping experience to customers. The checkout process and its related touchpoints are especially critical in shaping customer experience. We study the impact of adopting one-click buying, a feature that reduces the number of steps required to place a purchase order to a single click, on subsequent customer behavior. Using quasi-experimental data over a period of 35 months from an online retailer before and after the launch of one-click buying, we find one-click buying is effective in lifting customer purchases and does so by making treated customers purchase more often with more items per order. The impact of one-click buying on customer purchases post adoption is economically significant, persistent over time, and heterogeneous across customers. Analyzing clickstream data of customer activity online and purchases across product categories, we provide evidence that the increase in purchases is driven by richer engagement through both more visits to the website and more page views upon visit as well as the expansion of purchases across categories. We discuss the implications of our findings for customer experience and targeting.

2 - How Valuable is the First Visit to a Merchant in an E-Marketplace

Xueli Zhang, National University of Singapore, Singapore
Sadat Reza

This paper examines the connection between the first visit to a merchant and buying from that merchant in an e-marketplace. Specifically, the empirical study focuses on estimating the value of the first visit to a merchant in such e-marketplaces using a clickstream dataset from an online cashback platform. It is motivated by the observation that the probability of purchasing from a merchant is higher if consumers first visit the merchant when they logged in to

the e-marketplace than they first visit other merchants, which indicates self-selection by the visitors. Thus, the challenge is how to identify the treatment effect of the first visit to a merchant from observational data, given that consumers self-select their visit choices. To mitigate the extent of self-selection, we examine the behaviors of the users who browsed other merchants' platforms following their visits to the first choice merchants. This way we exclude, to a large extent, those users who pre-determined their merchant choices for purchases. Then, we apply the monotone treatment response and monotone treatment selection arguments to identify the treatment effect bounds of first visit to a merchant for both purchase probabilities and purchase values. Finally, we obtain point estimates of these treatment effects under the unconfoundedness assumption using two methods: generalized random forest and propensity score matching. In general, we find the two sets of point estimates to be consistent with each other with being within the partial identification bounds, barring a few exceptions. Following this, we investigate the relationship of merchants' market share and cashback rate with the first visit effects. We find that the first visit effect is more pronounced for larger platforms that generate more traffic to the e-marketplace. This research provides rich managerial implications for both merchants and the platform in terms of estimating optimal investments in customer acquisition activities in an e-marketplace.

3 - Product Return Increase Sales on E-commerce Sites? -- An Analysis using Matrix Factorization Approach

Sohum Mehrotra, Marketing PhD Student, Indiana University at Bloomington, Bloomington, IN
Shibo Li, Baohong Sun

E-commerce sites make brand selection, pricing, promotion, and return policy decisions across many cross- category/brand items. Lenient return policies and promotions jointly increase purchase, but the 20-30% return rate is problematic. Therefore, such platforms must consider the positive effects of product return on 1) increasing net sales and 2) encouraging customer exploration of new product categories/brands. Most extant research solely focuses on the return policy of a single product category/brand, which leaves many questions unanswered in the context of e-commerce: 1) what is the interplay of consumer purchase and return decisions and do these decisions spill over to other category/brands? 2) do the promotion methods differentially affect purchase and return decision? 3) how does each promotion method impact immediate sales, return, and across category/brand expansion - all of which subsequently impact net sales? 4) can return policy and promotion design be improved to leverage the effects of product return? In this paper, we propose a nested

hierarchical factorization model to jointly model consumers' brand purchase and return decisions across many product categories/brands. We adopt the recently developed matrix factorization approach with variational Bayes and stochastic gradient descent. Compared to standard choice models, this ML approach allows us to derive statistical inference, consider a large brand choice set with stock-out consideration, and permit price and promotion coefficients to vary and correlate across brands. The model was applied to across- category/brand consumer purchase history data that was collected by a flash sale e-commerce website. The results demonstrate the dynamics as well as the interplay between the two decisions. We show the spillover effect of price and promotion on purchase and return across category/brands. By comparing four different promotion types on purchase and return, we provide important actionable implications for marketing practitioners on the improvement of their promotional strategies to improve net sales.

4 - Modeling the Composition of Online Assortments and its Impact on the Consumer Decision Journey: An Empirical Study of an OTA Website

R Venkatesh, Professor of Business Administration, University of Pittsburgh, Pittsburgh, PA
K Pallavi Jha, Rabikar Chatterjee

Online retailers, or e-tailers, have the ability to present distinct online assortments in response to consumers' specific search queries. In this study, we empirically examine the influence of two types of assortments—an available set provided by the e-tailer and a subsequent consideration set formed by the consumer— on consideration set formation and choice. We conceptualize two assortment characteristics: (a) Assortment heterogeneity or the diversity of the e-tailer's presented offerings on vertical attributes, such as ratings that connote a quality differential among alternatives, and horizontal attributes, such as the appearance of offerings that appeal to differences in consumer tastes; and (b) Assortment organization or the nature of ordering or sequencing of offerings within an assortment. Drawing on economic and behavioral theories of differentiation, variety, and consideration, we propose and empirically test a set of propositions linking the above-noted independent and dependent variables. Our two-stage econometric model is estimated on a large secondary dataset from a leading online travel agency (OTA) for hotel search and choice in a popular European capital. While the initial consideration stage relies on a multinomial logit model, the later purchase stage draws on rare events modeling methods to account for the low

conversion rate from consideration to purchase. The empirical results of the study as well as their theoretical and managerial implications are discussed.

SA06

Virtual Room 06
Machine Learning Applications I
Contributed Sessions
Chair: Amrita Dey
University of Utah,

1 - Algorithmic Lending, Competition, and Strategic Information Disclosure

Qiaochu Wang, Tepper School of Business, Carnegie Mellon University, Pittsburgh, PA
Yan Huang, Param Vir Singh

Machine learning (ML) algorithms used by financial lenders in their screening processes are hidden from the consumers who are affected by their decisions leading many consumers to make sub-optimal decisions when seeking credit. Despite increasing calls for greater transparency, only a few lenders provide personalized approval odds to consumers (e.g. via financial intermediaries like Credit Karma or pre-approval tools). We investigate how competition among algorithmic lenders affects their decisions to provide approval odds to consumers. We show that competitive pressures between lenders can undermine the disclosure incentives. Lenders use asymmetric disclosure of approval odds strategically to soften the competition when their algorithms are fairly accurate. The asymmetric disclosure of approval odds endogenously creates product differentiation and allows lenders to focus on different segments of consumers softening the competition on the interest rates. We find that consumer surplus is highest when both lenders provide approval odds and lowest when neither provides approval odds. However, our analysis also shows that any policy that mandates all lenders to provide personalized approval odds to consumers may not necessarily improve consumer surplus.

2 - Discovering Product Gaps in the Market

Alex Burnap, Yale University, New Haven, CT
, John R Hauser

Successful firms develop products that meet consumer demand, are feasible to produce, and sell at a premium over costs. Marketing science has a long history of identifying product gaps, usually in perceptual space, that lead to the greatest revenue (and sometimes profit). We build on this history using extensive data available in the automotive industry, in which we combine optimization methods with

a deep learning model to search a high-dimensional space to generate new product concepts that balance demand (more is better), engineering feasibility (must be able to be built), and costs. The demand and engineering models use dual Wasserstein autoencoders to compress high-dimensional data on consumers and products to represent both heterogeneous consumer demand and realistic design feasibility. A search algorithm is used to discover product gaps and, in doing so, generates feasible and profitable new product concepts. We test our approach with empirical data from the US automotive market. The data are based on over one million revealed purchases. Consumers are represented by 900 attributes and feasible automotive designs are represented by 1200 attributes. Preliminary results suggest that it is possible to identify product gaps enabling firms to search for profitable new products.

3 - Role of Concreteness in Multimodal Communication

Amrita Dey, University of Utah, Salt Lake City, UT
Tianyu Gu, Yu Zhu, Stephen Carson

There is an increasingly higher dependence on a combination of multiple forms of media (textual, visual, and meta information), among marketers, to promote their products and services. So far, there has been significant academic interest in the concreteness of textual elements and their role in communication. However, there is very little understanding of how visual concreteness and its metrics play a role, despite visual communication being a critical component in communication. Also, the perspective to include a comprehensive and integral account of measuring concreteness is missing from the literature.
In this study, we address these issues and study the role of image concreteness and text-image information fit in the context of online crowdfunding. We employ novel methodologies for a long-tailed object detection approach based on MASK RCNN and LVIS along with a combination of object detection, word embedding and high-dimensional text comparison techniques to assess the fit between text and image.Our findings show that concreteness benefits crowdfunding success at both text and image levels, although the concreteness of the project title has a negative effect. Also, we find that a high fit between text and image information improves the performance of crowdfunding projects. An additional survey among respondents from the Prolific platform further validates our findings.

SA07

Virtual Room 07
Digital Marketing I

Contributed Sessions
Chair: Christina Giakoumaki
DEREE-The American College of Greece

1 - Blessing or Curse: The Role of Traditional Advertising on Promoting Internet-based Donation Campaigns

Yashar Dehdashti, Texas Wesleyan University, Fort Worth, TX
Aidin Namin

Current methods of creating awareness about online crowdfunded donation campaigns are mostly limited to online tools (e.g., sharing, tweeting, and so on). The news media have recently begun to share the news about some of these campaigns that have been deemed newsworthy (e.g., the Orlando shooting, Flint water crisis, etc.). Since the aim of this research is to measure the effect of an intervention (treatment) using secondary data, one might argue that other factors besides the treatment produce the results; a problem which is easily addresses in experimental settings through randomization. Propensity-score matching (PSM) is used to address this issue. Given a number of observable characteristics of the donation campaigns, propensity scores are estimated and closest observations are matched and compared (nearest neighbor method). Consistent with the literature on news media coverage, this study finds that campaigns that are shared on both the social media and news media do significantly better than those that are merely shared on the social media. This particular context (online donation campaigns) has never been studied. This analysis has important implications for raising awareness about online donation campaigns.

2 - Tidy your Room! The Impact of Product Evaluation Context on Augmented Reality's Effectiveness in E-commerce

Alexander Pfaff, LMU Munich School of Management, Munich, Germany
Martin Spann

Augmented Reality (AR) enables consumers to project product holograms into their surrounding real-world context in real time using their mobile devices. While AR may improve consumers' product evaluation, AR-deploying retailers give up control over the context their products are evaluated in. Hence, their products might end up being evaluated in unfavorable contexts. Consumers' real-world contexts oftentimes deviate from stylized product presentation contexts which can be found in retailers' catalogs or online shops, for example. Negative spillover effects from context onto perceptions of evaluated products may lead consumers to refrain from purchase. In an online experiment with 400

participants, we find that contextual untidiness negatively affects consumers' product quality perception and purchase intent. Contextual brightness mitigates this effect. We derive theoretical and practical implications and give ideas for future research.

3 - Do Not Invade my Personal Space! Strength of Ties in Social Media and Paid Ad Intrusiveness

Elham Yazdani, University of Georgia, Athens, GA
Anindita Chakravarty, Sakshi Babar

With the surge of paid ads on social media such as Facebook, the perception of customers towards this kind of advertising is often more negative than positive. For instance, while exposure to customized ads can increase the efficiency of customer purchase, many users report that they find paid ads to be intrusive and even creepy. Such perceptions most likely dampen the effectiveness of paid search advertising. In this research, we apply the strength of ties theory to understand if a user's perceptions of ad intrusiveness and creepiness might depend on the user's strength of ties with 'friends' whose posts are visible before the ad. We propose that stronger the tie, the higher the perceived ad intrusiveness and creepiness. Strong interpersonal ties with friends involve more intimacy and higher emotional involvement with the content posted by those friends, while users might be non-involved with information posted by weak friendship ties. As a result, an ad that appears after a flow of posts from stronger ties might invade the user's personal space and be considered intrusive or creepy to a greater extent than if it appears after posts from weaker ties. To have a deeper understanding of the underlying mechanisms, we also look at different moderators on the impact of friends' strength of ties on perceived ad intrusiveness and creepiness. For example, the strength of user's relationship with the advertised brand or the type of product or service being advertised or the relevance of the ad to the user's needs can impact the intrusiveness and creepiness perceptions. We follow a multi-step methodology. First, we collect primary data about the activity of real users on Facebook for 15 weeks. We obtain perceptions of posts, ads, and tie strength of friends during users' real time Facebook activity. With this data, we are able to understand if empirical patterns exist between strength of 'friends' tie and ad perceptions after controlling for both the emotional and cognitive elements of the ad and its popularity. We follow up with lab based and MTurk experiments to understand causal effects and test moderators.

4 - Digital Engagement with Luxury Brands on Social Media: An Experimental Study

Christina Giakoumaki, DEREE-The American College of

Greece, Athens, Greece
Areti Krepapa

The purpose of this research is to determine drivers of digital engagement with luxury brands on social media. Engagement is a key metric for social media marketing and has attracted considerable attention in the literature and more so in the research area of luxury brand digital marketing. In particular, recent research on digital engagement suggests that individuals with greater tendency to incorporate brands into their self-concept are more likely to engage with luxury brand social media posts. This study is based but also considerably extends the relevant literature by modelling the relationships among Brand Engagement in Self Concept (BESC) and Digital Engagement (DE) with luxury brand social media posts. More specifically, we develop and test a model in which the Self-Brand Connection (SBC), i.e. the extent to which consumers integrate a specific brand into their self-concept, mediates the relationship between BESC and DE and that this indirect effect is further moderated by the type of source posting the social media content. Our model is tested in empirical data from a between-subjects experimental design. The results reveal how SBC fully mediates the relationship between BESC and DE and demonstrate that social media post source moderates not only the direct effect between SBC and DE but also the indirect effect of BESC on DE through SBC. Our findings yield original and actionable insights for luxury brand social media marketing. It is demonstrated that SBC is a key factor in building digital engagement and that social media users engage more with posts from marketer-controlled sources (brand, influencer) than with posts made by individual users. The findings have specific practical implications for the design and implementation of social media campaigns by luxury brand marketers.

SA08

Virtual Room 08
Text and Image Analytics
Contributed Sessions
Chair: Yao Yao
San Diego State University, San Diego, CA

1 - Expression of Emotions in Ads Over Time
Stefan Kluge, University of Mannheim, Mannheim, Germany
Leonie Gehrmann, Florian Stahl
Although advertising is generally meant to inform consumers of a given product or service, marketers often also resort to emotions to appeal to consumers and raise awareness for their offering. Substantial research efforts have been interested in emotional advertising and its impact on consumer attitude formation. Ideally, the ad evokes the desired emotional response from consumers, although real-world examples have initiated adverse feedback. While existing research focuses on the emotions elicited in consumers, we investigate how advertisers have expressed emotions in their print advertisements over the past century. Our sample consists of all issues of "The Economist" in the time period 1900 - 2014. We analyze both textual and visual cues provided in the ads, as well as the articles of the magazine to understand how the display of emotions has developed over time. Thereby, we consider how the emotion portrayed in ads and articles compares and whether it changes due to historical events. From a managerial perspective, our study predicts to what extent the emotions of ads and articles are synchronized with the general societal sentiment.

2 - Assessing Brand Personality on Social Media: Application of Natural Language Processing and Machine Learning
Jihyeon Ha, Emory University, Atlanta, GA
David A Schweidel, Inyoung Chae, Kunpeng Zhang
Brand personality, the set of human characteristics associated with a brand, is communicated through marketing communications and plays a crucial role in consumer behavior by serving as self-expressive or symbolic function in their consumption of brands (Aaker 1997, Fournier 1998). As the explosive growth of social media has changed practices of firm-initiated marketing communications, firms have increasingly expanded their branding efforts to social media platforms. This shift has provided the opportunity to understand how firms foster brand personality through firm-generated content on social media. In this study, we capture brand personality communicated through firm-generated texts in social media at the post level, based on Aaker's five personality dimensions (Aaker 1997). We leverage cutting-edge transformer-based language models into our semi-supervised learning framework where pre-trained models and human annotations are combined to improve the prediction power. We validate and demonstrate the superiority of our implemented model by comparing to several representative baselines. The resulting model enables us to predict how each text posted by brands would be perceived in terms of the five personality dimensions on a large scale. Leveraging a novel dataset of posts from 144 U.S brands across three social media platforms (Instagram, Twitter, and YouTube) in 2017 - 2019, we examine how brands position themselves in the personality dimensions with social media and how they evolve over time. We posit that such evolution of brands personality is affected by social media users' reactions (e.g., likes and comments) as well as their competitive environment. Thus, in

this paper, we offer a holistic insight of brands' dynamic social media strategies based on brand personality, interacted with their external environment.

3 - Analyzing users' Posting Behavior on a Q & A Website using LDA and BTYD Model

Shohei Hasegawa, Hosei University, Tokyo, Japan

In the case of contractual services, customer withdrawals can be observed when the customer terminates the contract, whereas in the case of non-contractual services, those cannot be observed directly. For example, in a subscription service, which is a contractual service, the firm can observe a customer withdrawal if the customer stops to pay a monthly fee. However, in an e-commerce site, which is a non-contractual service, the firm cannot observe a customer withdrawal if the customer stops using the service or switches to competitors. BTYD (Buy Till You Die) model is a statistics model to analyze these non-contractual settings and estimate customer's withdrawal status and CLV (Customer Lifetime Value). In this paper, the author analyzes data from a Q&A website for mothers to solve questions about everything from pregnancy to childcare. This service is non-contractual-based and users' posting dates and texts can be observed, but users' withdrawal cannot be observed. The purposes of this research are to (1) model users' posting behavior and withdrawal by BTYD model, (2) predict the number of future posts, i.e., the amount of content generated by users, (3) extract the users' interests from their posted texts by LDA (Latent Dirichlet Allocation) , and (4) analyze the relationship between the users' interests and the users' posting behavior, withdrawal and the number of future posts. The analysis results show that users who are interested in pregnancy post more questions but withdraw from the service earlier than others, implying that these users stop using the service after the birth of the baby. In order to retain these users, it would be effective to provide incentive to encourage them to continue using the service after giving birth.

4 - Frugality Versus Thrifty: The Gender Difference in Saving Behavior

Alex Yao, San Diego State University, San Diego, CA
Ying Bao, Maria Rodas, Chen Gong

This research focuses on how gender shapes people's saving behaviors - namely, frugality or thriftiness - by leveraging a unique dataset from a major social media platform. By analyzing people's posts on social media using machine learning algorithms to classify different behaviors, our results suggest that males tend to be more frugal, as they are more anti-consumption focused and their saving behaviors are often related to DIY, homemade, and meal prep; while females tend to be thriftier, as they are more pro-consumption

focused and save through collecting coupons, sales, and discount information. Moreover, in terms of the topics or items people cuttings budget on, we also see a clear gender difference by using textual analysis. In particular, we find the males tend to focus more on necessary products, such as food; while females tend to focus more on discretionary products, such as personal care. We supplement our analysis with an experiment to show the generalization across different cultures and explore the underlying mechanism of the study. Our findings highlight how sellers can use marketing communications to increase the salience of the product features such as long lifetime or deep discount.

SA09

Virtual Room 09
Ad Content and Market Outcomes I
Special Sessions
Chair: Joonhyuk Yang
University of Notre Dame, Notre Dame, IN
Co-Chair: Hortense Fong
Yale School of Management, New Haven, CT

1 - Understanding the Role of Advertising in Driving Store Traffic: The Case of Home Improvement Stores

Bowen Luo, Northeastern University, Boston, MA
Bhoomija Ranjan

We investigate the role of advertising in driving store traffic using a mobile location panel with store visits of six million individuals. We explore how own and rival advertising effects vary with customer-to-store distances, ad content, and customer expertise. Customers make significantly more visits to stores that are closer than competitor stores. We find a positive own advertising effect that is diminishing in the customer-to-store distance, suggesting travel costs attenuate ad effect. Rival ads, on the other hand, might steal traffic or generate a positive spillover, depending on the customer distance to the own store and the rival store. We also find promotional ads more effective in driving own store traffic than non-promotional ads, but rival promotional ads are more harmful than rival non-promotional ads. While the absolute advertising effects vary with customer expertise, the percentage effects do not, suggesting retailer advertising is not working by conveying information about product quality. Our findings imply retailer advertising works through communicating promotions and reminding consumers and raising their attention to the retail brand and the category.

2 - TV Advertising and Media Multitasking

Zachary Nolan, University of Delaware, Wilmington, DE
Matthew McGranaghan
We analyze media multitasking---simultaneous engagement with multiple media sources---by combining TV set-top box data with novel internet usage data. The internet usage data contain the exact timing and device used to visit specific content providers and websites, giving us a comprehensive record of household media viewing habits. Incorporating TV ad schedules, we document a significant increase in internet activity following the start of TV ad breaks, with heterogeneity in the effect across households. We document the degree of multitasking as a function of ad content, programming content, device type, time of day, and household demographics. The variation in second screen usage is consistent with documented ad-avoidance and information-seeking behaviors.

3 - Voice Analytics of Online Influencers — Soft Selling in Branded Videos

Serim Hwang, Carnegie Mellon University, Pittsburgh, PA
Xiao Liu, Kannan Srinivasan
Influencers have been growing rapidly on social media and the influencer marketing industry is now worth $15 billion. As more consumers rely on influencers' recommendations for shopping, the trustworthiness of influencers becomes a key question. Specifically, consumers increasingly question the credibility of influencers while watching sponsored videos. To help consumers make informed shopping decisions, the Federal Trade Commission (FTC)'s endorsement guidelines require influencers to disclose sponsorship. However, little is known about how influencers react to the FTC's endorsement guidelines. This paper studies how influencers change their vocal delivery upon sponsorship and how their vocal changes affect consumer sentiment. For identification, we employ three causal identification strategies (IV, FRD, and TWFE). For feature representation, we leverage computer vision deep learning methods such as Generative Adversarial Network (GAN) and a leading object detection model (Mask R-CNN). As a result, we find that influencers choose a soft selling strategy and significantly tone down their voice loudness in sponsored videos. This voice modulation strategy can help influencers win back favorable consumer sentiment. Influencers who are not-yet-famous but rapidly accumulating their Instagram followers are likely to use the voice loudness modulation strategy. Our research provides implications for the government (FTC), firms, influencers, and consumers.

4 - Leveraging Musical Attributes in Brand Videos to Drive user Engagement on Social Media

Vamsi K. Kanuri, University of Notre Dame,
Notre Dame, IN
The widespread use of social media videos to increase a brand's reach through virality has drawn scholarly attention to the visual components of videos, but research on their audio features remains scant. In this paper, we explore whether tempo variation - a key audio feature that captures the break in the pace of sounds when beat occurrences speed up or slow down - can influence the virality of brand videos. Using state-of-the-art feature extraction techniques to mine second-by-second frames of audio features from unstructured data involving 5,430,960 seconds from 69,374 videos posted by 548 brands on their dedicated Facebook pages over a 6-year period, we find a strong negative association between tempo variation in brand videos and the number of times videos are shared on the social media platform. Heterogeneity in this association provides suggestive evidence that this link is due to auditory distraction, whereby tempo changes trigger an orienting response in consumers towards understanding the new sound progression, which can interfere with information processing and reduce virality. We further confirm this process by leveraging an exogenous change to Facebook's video sound policy. Our results are robust to a range of econometric models, matching specifications and sensitivity analyses, and have implications for engineering video virality and applications in multimedia content design.

SA10

Virtual Room 10
Healthcare Marketing
Special Sessions
Chair: Jian Ni
Johns Hopkins University, Baltimore, MD
Co-Chair: Jiang Qian
University of Houston, Houston, TX

1 - Principal, Agent, and Information in Healthcare Product Choice: The Case of U.S. Renal Disease Patients' Choice of Dialysis Center

TI Tongil Kim, University of Texas at Dallas, Richardson, TX
Reza Roshangarzadeh, Shervin Tehrani
Dialysis is a critical means to extend the lifespan of more than 400,000 End Stage Renal Disease (ESRD) patients in the U.S., whose treatment accounts for approximately 20% of the U.S. Medicare program. As a result, quality-of-care improvement in this domain implies not only saving more lives, but also reducing substantial healthcare costs. For first-time dialysis patients, their choice of dialysis center is of utmost importance as it can significantly affect their overall well-being during treatment for ESRD. This decision process, as is

often the case for uncommon, complex healthcare products, is usually an outcome of shared-decision making between the patient and physician. This study analyzes such decision making under uncertainty in the principal-agent problem, where the agent (i.e., physician) makes recommendations about treatment options for the principal (i.e., patient). Using 2013-2015 data on U.S. ESRD patients and their referring physicians who recommend a set of dialysis centers for new patients, we aim to structurally model patients' dialysis center selection process. Our model accounts for multiple sources of uncertainty in the environment, such as physicians' uncertainty about the characteristics of dialysis centers and the match values of specific centers to their heterogeneous patients, as well as the patients' uncertainty about the value of each recommended center to their needs. Given our structural framework, we can empirically recover the agents' recommendation to principals, which allows us to explore ways to improve quality-of-care through counterfactual analyses.

2 - Can Emergency Care Advertising Benefit Patients?

Tae Jung Yoon, KAIST College of Business, Seoul, Korea, Republic of
Simon Kim, Ti Tongil Kim

U.S. hospitals have substantially increased spending on advertising in recent years, with a substantial portion of it focused on emergency care. This is in contrast with a common belief that advertising may not be effective for patients choosing a hospital in the midst of medical emergency, and little studies have examined the impact of such advertising. Using individual patient hospital discharge data and hospital television advertising data from Florida, we investigate how hospital advertising affects emergency department (ED) patients' choice of hospitals and subsequent health outcomes. We find that ED patients' travel distance to hospital increases when they are exposed to a higher level of hospital advertising focused on emergency care. We also observe substantial heterogeneous responses in terms of patient characteristics and location-specific factors. We further discuss subsequent implications in patient health outcomes to determine whether emergency care advertising can ultimately benefit patients.

3 - Sunk Cost in Mhealth Dynamics

Yikun Jiang, University of California-Berkeley, Berkeley, CA
Nathan Yang

Our research aims to study the sunk cost fallacy in subscription-based services for mHealth. Using data from a popular Freemium mHealth app, we first provide empirical evidence that premium subscription fees might generate similar effects as the sunk cost fallacy. In particular,

we demonstrate using propensity score matching causal inference that the mHealth users appear to be more engaged in multiple dimensions (e.g., tracking consistency, food and exercise log entries) when they have adopted the premium version (all else held equal). Furthermore, we uncover a novel empirical phenomenon, whereby this inferred sunk cost effect exhibits temporal patterns (i.e., decaying over time).

4 - Health Inequality in Tele-medicine: The Ironic Effect of Video Provisions

Jiang Qian, University of Sydney, Sydney, Australia
Jian Ni, Meng Zhu

The distribution and allocation of healthcare resources are important indicators to address health inequalities. Telemedicine through virtual visits, as an alternative to physical office visits, allows patients from regions with scare health resources to access high-quality healthcare. However, patients might face greater uncertainty when selecting a therapist through text-only webpages. The offering of profile videos and AI tools allows therapists to introduce themselves and provide details on their services. In this study, we investigated whether the introduction of videos has an impact on the pricing of teletherapy services. We construct a similarity measure between the therapist's appearance in the profile images and the profile videos, using machine learning techniques. Leveraging a causal inference framework, we find that the introduction of profile videos could lead to a premium for teletherapy price, and higher similarity between videos and pictures could generate even higher premiums. In other words, while the introduction of profile videos may bring some benefits of reducing patient uncertainty in selecting a therapist online, it could amplify and further jeopardize inequalities in access to healthcare.

5 - Incentivized Peer Referrals in Health: Field Experiment Evidence from Zambia During Covid

Pradeep Chintagunta, University of Chicago, Chicago, IL

In this paper, we report the results of a randomized controlled trial conducted in Zambia to study whether peer networks can be leveraged to promote the spread of in-formation about COVID-19 preventive behaviors using available technology (basic cellphones). Specifically, we tested whether individuals can be encouraged or incentivized to forward SMSs with their contacts, whether such messages have an effect on the recipients' behavior, and whether effects depend on the sender (government health authority or part of one's peer network).

SA11

Virtual Room 11
Digital Marketing Strategy
Contributed Sessions
Chair: Rajan Mishra
Purdue University

1 - The Effect of Recommender Systems on Online Investor Behaviors

Ruiqi Zhu, Georgia Institute of Technology, Atlanta, GA
Recommender systems have been widely applied in online retailing, which have been shown to have an impact on consumers' purchase behavior. The growing online E-commerce platforms where people can invest in mutual fund and financial products also see the prevailing existence of recommender systems. However, their impact on online investors' behavior is rarely documented. The distinction between investment and purchase behaviors as well as the attributional difference between financial and consumer products make the conclusions in previous literature doubtful to apply. In this paper, we employ regression discontinuity approach to causally examine the effect of recommender systems on online investor behaviors in mutual fund investment. The results show that (1) recommender systems have a significantly positive effect on purchase; (2) the recommendation effect is heterogeneous across different types of mutual fund and investors with different characteristics; and (3) the effect on holding period of recommended funds is heterogeneous across different investors. In addition, we examine the mechanisms and implications.

2 - Where Does the Sales of Sustainable New Products Come From?: New, Competitive, and Cannibalized Growth

Youngtak M. Kim, University of Georgia, Athens, GA
Sundar G Bharadwaj
Sustainable is no longer a strategic differentiator but a necessity. Consumer demand for sustainable products is growing and serving as key drivers of sales growth. As a result, companies have greater incentives to create sustainable products that serve the needs of consumers and societal (environmental and social) good to increase firm value. However, the corporate sustainability and social responsibility literature in marketing is limited to studies that observe firm-level initiatives with fewer implications at the brand and product level. Therefore, this study seeks to understand how sustainable new products influence the offerings of a brand using a demand decomposition approach. Using retail scanner data, we decompose the demand of sustainable new products to determine if they serve as sources of new (market expansion), competitive (substitution), or cannibalized growth. In addition, we observe the effects of the marketing mix elements and product moderators (certification, convenience, quality) that serve as contingencies. This offers theoretical and practical insights when considering the launch of sustainable new products.

3 - The Value of Reputation Badges in the Age of Ratings and Reviews: An Empirical Study of Airbnb's Superhost Program

Rajan Mishra, Purdue University, West Lafayette, IN
Guofang Huang, Manohar U Kalwani
We study the value of a reputation badge for high-quality sellers on e-commerce platforms amidst the availability of customer reviews and ratings. A reputation badge may serve as a quality signal for experience goods in markets with significant search friction due to, for example, the cost of reading reviews and ratings. Also, sellers with a reputation badge become more prominent than other sellers. When customers who search only a finite number of times search (high-quality) sellers with the badge first, they are less likely to leave the platform without buying anything. We estimate the impact of introducing the seller reputation badge by using a unique panel data set from Airbnb. In contrast to the extant research focusing on the impact of a reputation badge on individual sellers, our study focuses primarily on the overall impact of the seller reputation badge on the platform. Exploiting a regression discontinuity design and an exogenously fixed schedule of updating the Superhost badge, we find a strong positive effect of the Superhost badge system on the bookings and revenue of the Airbnb platform. Furthermore, we find evidence for two mechanisms that contribute to the positive effect. First, the Superhost badge facilitates the bookings of new properties with few ratings and reviews hosted by multi-property hosts by serving as a positive signal for the latent quality of host (service). Second, the Superhost badge enhances the prominence of high-quality hosts (of either single or multiple- properties) on the platform. This makes customers more likely to find a good match before they give up on searching. Overall, our findings suggest a significant positive value of introducing seller reputation badge system even for online platforms that already have customer reviews.

Saturday, 8:00AM - 9:00AM

SA12

Virtual Room 12
Multi-channels I

Contributed Sessions
Chair: Wei Liu
China University of Petroleum (Huadong)

1 - Logging Off: On Consumer Disengagement in Online Grocery Shopping

Els Gijsbrechts, Tilburg University, Tilburg, Netherlands
Katrijn Gielens

For the longest time, grocery ecommerce has been lagging behind. With Covid, an uptick in online grocery adoption is observed. But is do shoppers stick with the channel? Anecdotal evidence indicates that online experiences are not ideal and even after repeated trials, many disengage. An analysis of this issue is currently lacking, and our research fills this gap. Our objectives are as follows. 1. assess the prevalence of online grocery disengagement 2. pinpoint sources of disengagement 3. gauge the impact of Covid 4. uncover segments with different online channel (dis) engagement. Typically, online channels are praised for convenience - saving shopping time and effort. But does the online channel truly increase convenience? For one, online grocery shopping requires shoppers to acquire a new set of habits. Moreover, most shoppers keep buying groceries both online and offline; Online is thus not a substitute but a complement to store visits, implying that online affects offline, and carry-over effects alter shopping convenience. We use a 'smooth transition' approach to capture online grocery-shopping propensity as a function of experience, shopping pattern adjustments, and external factors. We combine this model with an online trip-share component as consumers do not shop online every week and use a latent class approach to address consumer heterogeneity. We use data on 10,000 Dutch households between 2015-2021. We find that the majority of online adopters do not stick and distinguish four segments (Dis)engagement follows from a tradeoff between experience, disenchantment, and shopping patterns adjustments. We see that Covid does not 'jump start' online grocery: while it tempts shoppers to try the channel, few are converted into permanent users.

2 - Adding Multiple Platform Apps: The Impact of Introducing a Competing App on the Focal App's Adoption Rate and Sales

Wei Liu, China University of Petroleum (Huadong), Qingdao, China
Sha Zhang, Tammo H A Bijmolt, Evert de Haan

With platform apps (e.g., Grubhub, Just-Eat, Booking.com) becoming a popular sales channel, firms, especially those in the restaurant- and hotel industries, are adding multiple platform apps to their channel portfolio. Firms' motivation to add multiple platform apps is to increase exposure and sales (e.g., Marriott hotels listed on booking.com and on Expedia). Yet some platforms such as Meituan, China's largest food delivery app, required firms to sign exclusive cooperation agreements, assuming that adding a competing app will cannibalize the adoption rate and sales on Meituan. Previous channel addition literature mainly focuses on adding a single channel and ignores competitive interferences between channels. The impact of adding multiple apps, especially a competing app, on the focal app's performance has not been examined so far. Does introducing a competing app cannibalize or enhance a focal app's adoption rate and sales? How do introducing timing, store size, and age moderate the effect? We use social contagion theory and associative network theory to develop hypotheses. To test the hypotheses, we analyze a unique dataset of 220,108 customers' 513,249 purchase records between 1/1/2015 and 30/06/2016, where 18 stores based in Beijing from a restaurant chain added multiple food delivery platform apps. We use the Bass model for adoption of the app and meta-analysis methodology to obtain results across the stores. Interestingly, the results show that adding a competing app has synergistic effects on the focal app's adoption rate and sales. This effect is moderated by competing app addition timing, where the positive impact increases if the new app is introduced later. Thus, this study provides relevant new insights on the phenomenon of adding multiple platform apps.

SA13

Virtual Room 13
User Generated Content and Social Platforms
Contributed Sessions
Chair: Isil Büdeyri Turan
Özyeğin University

1 - How has the COVID-19 Changed the Online Knowledge-sharing Behaviors via Remote Working: Evidence from Stack Overflow

Jihoon Hong, Arizona State University, Tempe, AZ
Mengxia Zhang

The COVID-19 pandemic has dramatically affected how people work and communicate. As many employees start to work from home, they have been facing difficulties sharing and acquiring information with colleagues. Online knowledge-sharing platforms (e.g., Stack Overflow) may provide a solution to this rapidly changing environment, as employees may alternatively choose to exchange information on such platforms when working remotely. Thus, we study the impact of the COVID-19 pandemic on users' entry and contribution behavior on online knowledge-sharing platforms.

We collect 3,842,184 questions and 4,328,060 answers posted by 1,661,308 users on Stack Overflow, the largest online knowledge-sharing platform, from September 2018 to September 2020. We use a difference-in-differences model to leverage the exogenous pandemic shock. We find that after the outbreak of the COVID-19 pandemic: (i) the quantity of the total contributions (questions and answers) increases, but the average quality of them decreases; (ii) the contribution per user and new user entry significantly go up, leading to the result (i); (iii) female users have larger membership growth and ask more questions while providing higher quality answers, compared to male users; and (iv) the results (i) and (ii) become more salient in the regions where the workplace closure is ordered or where the number of workplace visits decreases. We discuss implications for online knowledge-sharing platforms and the firms adopting remote work in the post-COVID era.

2 - Nature Leads Social Media and Beer Sales: Weather vs. Price in a Dark Market
Işıl Büdeyri Turan, PhD Fellow, Özyeğin University, Istanbul, Turkey
M. Tolga Akçura, Koen Pauwels
Changes in weather have significant impact on consumption patterns. This impact extends to social media behavior. This paper studies the impact of year-on-year weather changes and extreme temperature variations on beer consumption as well as the corresponding user-generated content on social media. The authors build a vector autoregressive model to investigate the dynamic interactions among sales, social media volume, valence and price, using temperature in the model specification. The findings help assess how the effectiveness of a social media volume generating campaign can be optimized based on price, positive valence and weather analytics. The results suggest that the direct impact of temperature on sales is much stronger than that of price, and price promotions may not always work in increasing the effectiveness of a social media campaign, and thus sales. The paper discusses strategies that managers can follow to increase social media campaign effectiveness when temperature impact is stronger vs. weaker. Moreover, the paper emphasizes the necessity of incorporating effective weather parameters into social media and sales analytics, for getting unbiased estimations and generating optimal social media campaign strategies.

SA14

Virtual Room 14
Bayesian Modeling
Contributed Sessions

Chair: Max Pachali
Tilburg University

1 - Unveiling Consumer Preference from Real-time Search Traces using a Bayesian Dynamic Approach
Zhiying Hu, Georgia Institute of Technology, Atlanta, GA
Xiaojing Dong
Making inferences about consumer preferences has been instrumental in targeting and personalized recommendations. Traditional methods have relied on access to historical consumer level data. Such data become less available given the rise of regulatory privacy protections. In this study, we develop a Bayesian dynamic approach to unveil consumer preferences by leveraging their real-time search traces. This approach opens a window for firms to improve consumer search experience and recommendation at an early search stage with minimal information burden, without tapping into the privacy-sensitive data, such as the historical purchase data. To achieve that, we build a Bayesian model to capture real-time information and evaluate individual level price-quality tradeoff in a dynamic manner. Using a utility form that tailors to price and quality tradeoff, we offer a closed-form solution, which enables transparent understanding of how important factors in the process together shape consumer search decisions. We test the model performance in a controlled simulation and a real-world dataset from a large travel website using Markov chain Monte Carlo method. Both simulated and real-world applications of this new approach demonstrate powerful prediction advantages, indicating that firms can effectively discover consumer preferences leveraging the real-time search data.

2 - A Bayesian DLM Model for Brand Equity
Morgan Bale, PhD Candidate, Drexel University, Philadelphia, PA
Elea McDonnell Feit, Eric T Bradlow
This paper presents a statistical model to measure brand equity as it changes over time, and gauge the impact of changing brand equity on consumers' product choices. Our model extends traditional models of brand equity by using weekly UPC-level product choices (nested within brands in a hierarchical way) to estimate a brand's dynamic equity, while also (in a new to the literature way) accounting for dynamic brand equity's affect on attribute coefficients. Due to the potential for both marketing mix and price endogeneity, we introduce a two-level copula structure as price and marketing enter our Bayesian models at different levels. We apply the proposed model in an empirical application using a panel data set of households' purchases in the diet soda category, demonstrating that brand equity has a measurable effect on

price sensitivity and other attribute coefficients. We utilize our model to optimize the timing and depth of marketing and to derive optimal weekly prices comparing those results to simpler benchmark models. As we show, this extended model provides firms and researchers with a more comprehensive view of brand equity, and leads to novel strategies for building and exploiting the strength of a brand.

3 - Constrained Heterogeneity

Max Pachali, Tilburg University, Tilburg, Netherlands
Tetyana Kosyakova, Adam Smith, Thomas Otter
Distributions of preferences and other economic primitives are often key inputs in market-level counterfactual analyses. In empirical work, these distributions must be inferred from finite amounts of data where measures of statistical fit often favor simple - yet ad hoc - parametric assumptions. In this paper, we investigate ways of imbuing preference distributions with healthy doses of economic rationality through sign and order constraints. Such constraints naturally arise whenever product attributes such as quality or price can be vertically ordered a priori. We illustrate the merits and the disadvantages of imposing such constraints using (i) truncated normal and (ii) log-normal distributions. We then develop a model that enables the analyst to structure random coefficient distributions according to basic economic arguments using a combination of log-normal, truncated normal, and unconstrained distributions. We develop feasible Bayesian inference for this model based on MCMC, and illustrate that imposing economic constraints improves the accuracy of inferred production costs and counterfactual price predictions after the mandatory ban of cage eggs using German household scanner panel data.

Saturday, 10:15–11:15am

SB01

Virtual Room 01
AI Adoption Theory and Implications
Contributed Sessions
Chair: Liying Qiu
Carnegie Mellon University, Pittsburgh, PA

1 - AI for Crowdsourcing? Integrated Theoretical Model for Idea Screening

Christian Pescher, Universidad de los Andes, Santiago, Chile
Jason Bell, Gerard J Tellis, Johann Füller

Crowdsourcing generates thousands of ideas. While a boon to innovation, selection of best ideas is costly because of the limited number, expertise, objectivity, and attention of judges. This paper builds a theory-based model to automate idea screening. The authors explore predictors inspired by three recently published models from the behavioral sciences: Word Colocation, Content Atypicality, and Inspiration Redundancy. Using least absolute shrinkage and selection operator (LASSO) versus Random Forest and RuleFit, the authors test performance of theory-based predictors in and out of sample. Data are from 21 different real-world crowdsourcing contests conducted for large firms. Results are the following. First, the Receiver Operating Characteristic curve (ROC) plots the false positive rate (x-axis) versus the true positive rate (y-axis) for values between 0 and 1; predictors inspired by each of the three original models contribute to in-sample and out-of-sample prediction, jointly providing the largest area under the ROC curve (AUC) of all models tested. Second, a new metric, Word Atypicality, predicts as well as this joint model but is more parsimonious and has higher screening efficiency. Third, method-wise, simple LASSO outperforms Random Forest and RuleFit. Fourth, the metrics are partial substitutes among the good ideas, but complementary at the bottom. Fifth, ROC curves show that this model with Word Atypicality can better screen out bad ideas than pick the single best idea, performing best when screening out as much as 44% of worst ideas for a false negative rate of only 15%. While the model still cannot pick the best idea, it provides an enormous gain in experts efficiency by eliminating almost half of bad ideas.

2 - Transfer Knowledge from Consumer Goods to Financial Products

Shenghao Wang, University of Iowa, Iowa City, IA
With the rapid growth of e-commerce, financial products are being brought onto online platforms. However, due to the scarcity of data in this new product domain, online platforms face challenges in predicting users' purchase behavior. In this paper, we study whether we can transfer knowledge learned from the existing consumer goods domain to benefit the prediction in the domain of the financial products. With data provided by one of the largest online shopping platforms in China, we develop machine learning solutions to enable knowledge transfer. We show that users' prior browsing and shopping history in consumer goods can significantly improve the prediction accuracy of users' purchases of mutual funds for both the existing-user and the new-user scenarios. In addition, we study the heterogeneous prediction performance lifts on users with different socioeconomic statuses and investment risk preferences. Results show that information from the consumer goods domain has a higher prediction performance lift on users in the high

socioeconomic group. Finally, we compare the effect of different sources of information on predicting users' purchases of mutual funds. We find that users' browsing and shopping history for consumer goods are more predictive than their profile features. Our findings and methods will be valuable to both the financial industry and online platforms that seek to expand their product domains.

3 - A Graph-based Geometric Deep Learning Technique for Personality Detection

Tolga M Akcura, Ozyegin University, Istanbul, Turkey ,Murat Sensoy

Personality research provides important guidance within intelligence, education, and business professionals. Neuroscience shows that consumer response heterogeneity can be attributable to individual differences in gray matter volume in brain areas associated with personality. In diverse settings, marketing researchers show that personality traits such as anxiety, self-confidence and task orientation have broad implications on brand choice as they foster satisfaction, affect consumer search, and brand loyalty. Thus, understanding consumer personality has important implications for marketing. For example, personality-grounded actions may precipitate ethical and sustainable marketing, and ultimately, most generally, creating and delivering consumer happiness. Personality is typically identified based on tests and questionnaires. Intelligent, real-time, observation-driven technologies either as part of algorithmic strategy formulations or managerial decision-support systems are in need. This research aims to discover personality indicators using consumer behaviour observations and recent machine learning techniques. The observation data come from social media, where a significant number of diverse users present their personality types in their public profiles after taking an online personality test. We represent these public profiles as graphs and use them to train graph neural networks to create predictors for automatic personality classification for other users. In this work, we use a heterogenous graph structure to represent consumer interactions and engagements. Users, keywords, locations and languages act as nodes in the graph. User nodes store metadata (user id, location, follower and following counts, shared media count, likes count etc.) about the user as features. Keywords, the words the users type when they share their content, are represented by BERT embeddings. Locations and languages are represented as one-hot vectors. Results show that the proposed technique enables highly accurate personality predictions.

4 - Ranking Systems and Algorithmic Collusion

Liying Qiu, Carnegie Mellon University, Pittsburgh, PA Yan Huang, Param Vir Singh

Reinforcement learning (RL) based pricing algorithms have been shown to tacitly collude to set supra-competitive prices in oligopoly models of repeated price competition. We investigate the impact of ranking systems, a common feature of online marketplaces, on algorithmic collusion. Through extensive experiments on a duopoly model where two firms utilize RL algorithms (specifically, Actor Critic) to set prices on a third-party platform that ranks products based on features such as recent sales and current period prices, we find that the introduction of the ranking system mitigates the tacit collusion that stems from RL based pricing. The ranking system's mitigation effect is moderated by the horizontal differentiation between the products offered by the firms and the stickiness of product ranks. In particular, when products are more horizontally differentiated from each other and when past sales have a larger influence on product ranks (sticky ranking), the prices charged by the two firms are higher and the ranking system's mitigation effect is weaker. However, in both cases, prices in the presence of ranking are lower than that in the absence of ranking. Our analysis sheds light on the impact of ranking systems on consumer welfare and on design of ranking systems to prevent algorithmic pricing collusion.

SB04

Virtual Room 04
Retailing and Pricing
Contributed Sessions
Chair: Yihao Yuan
University of Pennsylvania, Philadelphia, PA

1 - Competitive Disclosure of Multiple Product Attributes

James Dearden, Lehigh University, Bethlehem, PA Qichao Shi, Ernest Lai, David Goldbaum

Firms engaging in competition are motivated to make known to consumers the superiority of their products relative to their competitors'. When products have multiple attributes, this incentive manifests as a tendency to underscore the product attributes that represent one's strength and to downplay the attributes that are not as exceptional. In a familiar term, comparative advantages of some sorts are at work to influence what firms disclose and not disclose to consumers. This paper analyzes how this and other factors contribute to determine quality disclosure in a competitive setting with multiple product attributes. We analyze a duopolistic model of quality disclosure in which product differentiation can be either horizontal or vertical under two vertically differentiated product attributes. Disclosure is fully revealing in the absence

of disclosure cost. When disclosure is costly, firms partially disclose, and the characterization of the non-disclosure sets of the firms are shaped by three familiar economic properties, namely, product differentiation, comparative advantages, and intensity of price competition. When consumers fall short of forming rational expectation after non-disclosure, firms may partially disclose even without disclosure cost, and the three properties continue to dictate firms' disclosure behavior in the boundedly rational paradigm.

2 - The Size and Welfare Effect of Trade Allowances: Lessons from Yogurts

Yihao Yuan, The Wharton School, University of Pennsylvania, Philadelphia, PA

This paper examines how trade allowances affect consumer surplus. Trade allowances—lump sum payments from manufacturers to retail stores—may enable low-quality products to crowd out high-quality ones, which harms consumers (distortion effect). However, they may also allow cost sharing between manufacturers and stores, thus incentivize stores to offer more products (expansion effect). The overall effect of trade allowances on consumer surplus is therefore theoretically ambiguous. To quantify this effect, I estimate the size of trade allowances using a two-stage model, in which stores decide assortments and prices in each stage. In contrast to the prior literature, I utilize stores' revealed preferences to construct moment inequalities for estimation, which allows me to avoid imposing strong assumptions on the vertical relations between manufacturers and retailers. My estimates imply that trade allowances account for one fifth of the average store's profit. Counterfactual analyses indicate that eliminating trade allowances would reduce the number of products offered but would still increase consumer surplus overall. This suggests that the costs of distortion outweigh benefits from product expansion.

SB05

Virtual Room 05
Platforms I
Contributed Sessions
Chair: KItty Wang
University of Houston, Houston, TX

1 - Optimizing Personalized Promotions for Ride-sharing Providers in Two-sided Markets

Ali Kozehgaran, PhD Student, Syracuse University, Syracuse, NY
Scott A Fay

We examine how personalized promotions can improve the performance of two-sided platforms, using the empirical setting of Chicago's taxi market. Our focal taxi company links its drivers to passengers, where ride requests are made through three channels - a mobile app, non-app requests (e.g., via phone), and on-street hailing. While the taxi company directly assigns cab drivers to passengers who arrive from the first two channels, coordination is more complicated for passengers acquired via on-street hailing. Currently, because revenue-sharing is constant across routes, drivers search for passengers in areas closest to their most recent drop-off or in areas known to have heavy demand. However, because drivers have heterogeneous abilities (e.g., due to differences in familiarity with the traffic patterns of each geographical zone), search can result in inefficient matches between drivers and passengers. We use historical data to detect latent driver ability from their past behavior along with reducing model complexity through clustering routes and then apply data-driven stochastic optimization models to identify how redistribution of drivers can improve the company's profit. This can be implemented via personalized promotions for each driver. Specifically, drivers are incentivized and expected to follow the desired, pre-specified distribution pattern and in return, company demands a lower commission rate on certain clusters of routes associated with each driver. We find that, under this promotion strategy, the company could increase its annual net revenue by 7% despite the fact that drivers retain a larger fraction of gross revenue. This increase in profit is accomplished without raising fares, increasing unit market share or imposing higher workloads on the drivers, i.e., no driver is required to significantly increase its service rate in the system in terms of number of trips, time and distance.

2 - Impact of Uber's Acquisition of Postmates on Consumer Welfare

Pallavi Pal, Stevens Institute of Technology, Hoboken, NJ

This paper investigates the effect of acquisition in Multiside firms. Specifically, looking at the impact of Uber Eats' acquisition of Postmates on the quality and price of service provided to the consumers. The literature on platforms shows how the two-sided platform pricing on one side is impacted by cross-network effect from the other side. This has also led to differential treatment for merger analysis of the two-sided platform. For instance, Erkal and Piccinin (2010) show that mergers that do not increase cost-efficiency in any possible way strictly reduce consumer welfare. On the other hand, Shimomura and Thisse (2012) show that consumers may benefit from the existence of large firms because they make the market more competitive. To study the case of Uber Eats' acquisition of Postmates, I use a novel dataset that scraped the information available on Uber Eats and Postmates

websites before and after the purchase. The data contains information about the number of restaurants, delivery fee, delivery time, and offers provided through the platform. I collect information for two product categories, namely Pizza and Burgers. To identify the impact of the acquisition, we use the difference in the effects for the two product categories. The data showed a high competition between the platforms in the Pizza category compared to the Burger category. I capture the impact of the acquisition using a triple Difference estimator, where the difference is between the two platforms across the two product categories before and after the acquisition. The results show that the acquisition significantly impacts delivery fees and delivery time. Specifically, the difference in the delivery fee between the two platforms decreased after the acquisition announcement. Additionally, we find that after the acquisition was approved, there was a significant increase in the number of restaurants and offers made on the Postmates app.

3 - Fending Off Critics of Platform Power: Doing Well by Doing Good?

Kitty Wang, University of Houston, Houston, TX
Hemant K Bhargava, Luna Zhang

Many digital platforms have accrued enormous power and scale, leveraging cross-side network effects between the sides they connect (e.g., producers and consumers; or creators and viewers). Platforms motivate a diverse spectrum of producers, large and small, to participate by sharing platform revenue with them, predominantly under a linear revenue-sharing scheme with the same commission rate regardless of producer power or size. Under pressure from society, lawsuits, and antitrust investigations, major platforms have announced revenue sharing designs that favor smaller businesses. We develop a model of platform economics, and show that a small-business oriented (SBO) differential revenue sharing design can increase total welfare and outputs on the platform. While the small producers almost always benefit from the shift in revenue sharing design, large producers can also be better off under some conditions. More interestingly, we show that platforms are the most likely winner under a differential revenue sharing scheme. Hence, an intervention that ostensibly offers concessions and generous treatment to producers might well be self-serving for platforms and also good for the entire ecosystem.

SB06

Virtual Room 06
Machine Learning Applications II
Contributed Sessions
Chair: Jia Liu

Hong Kong University of Science and Technology, Hong Kong

1 - Understanding the Business-customer Network Using Consumer Mobility and Review Data -- A Heterogeneous Graph Transformer Approach

Baohong Sun, Cheung Kong Graduate School of Business, New York, NY
Jiaxin Du, Natasha Zhang Foutz, Xinyue Ye

Consumer mobility data is location-aware, temporary recorded, and contains customer choices of point-of-interest (POI). It is interesting to integrate customer offline mobility data with online contextual information to study customer choices of POI, derive a network that inter-connects customers and businesses, and compare the analytical network with its corresponding spatial distribution.
In this paper, we formulate the customer-business relationship as a heterogeneous information network. Specifically, we define POIs, customers, review, and census tract as four types of nodes and treat customer visits as edges that link all the nodes. By allowing each node and edge to carry its own attributes, this framework predicts customer choice by incorporating all the factors that could potentially affect today's customer POI choices, that is, the PGC, UGC, travel distance, latent preference, spatial location, and inter-temporal purchase pattern.We leverage the recently developed Heterogeneous Graph Transformer (HGT) to mine the heterogeneous and attributed network with large amount of variables and (often) non-linear relationship. The deep learning model predicts customer choices of POIs, infers the relative importance of all attributes, clusters customers, and derives competitive relationship among POIs, resulting in comprehensive marketing intelligence.We apply the model to a combined Yelp and mobility data with 8000 customers' visits to 1362 restaurants in Pittsburgh. Result show that restaurant features listed on Yelp contribute the most to the prediction of customer visits (58%), followed by customer preference (22.8%), online review (12.7%), and census data (6.5%). The model identifies three restaurant and four customer clusters. By aligning the analytical restaurant clusters with their geographic distribution, we demonstrate the difference between spatial and customer competition. Simulation show that enhancing an attribute favored by the target audience or moving closer to the customer base significantly increase foot traffic.

2 - B2B Persona Buyer Center Analytics

Lili Zhang, Hewlett Packard Enterprise, San Jose, CA
Zainab Jamal, Swarup Chandra

B2B typically has long and complex cycles with a purchase decision made by a group of decision makers in the buying center. Identification of people in the buying center and their influence becomes critical for marketing and sales to streamline their efforts. Persona-based marketing is an important way of designing strategies that place the buyer personas at the center to effectively engage the customers, leading to the improvements in click-through rate, conversion rate, and revenue. A persona is a representation of the customers' characteristics (e.g., demographics, job roles), among which the job roles are more relevant in B2B. In this work, we showcase how we have used data science methods (e.g., unstructured data analytics, natural language processing, topic modeling, supervised learning) to identify core buyer personas from millions of job titles and build the persona influence index based on their engagement and conversion behaviors. The outcome helps evaluate the information value of contact persona groups an organization has and strategically improve data quality to meet the goal of the buying center engagement. It also enables the intelligent persona-based audience creation for marketing campaigns.

3 - Location-based Market Structure: A Dynamic Analysis of Product Assortment and Consumer Purchase

Jia Liu, Hong Kong University of Science and Technology, Hong Kong
Kohei Kawaguchi

Market structure analysis aims to provide an understanding of the relationship (e.g., substitution and complementarity) among brands/products/services within a market so that practitioners can develop effective competitive strategies and create sustainable competitive advantages. Despite a large number of studies in this research area, practitioners are still in a great lack of guidance for customizing their assortment across multiple stores. This project aims to fill in this significant research gap by identifying different consumer segments and by quantifying the differences in their product and location preferences. To this end, we develop a machine learning model, called the dual Gamma-Poisson Dynamic System (dGPDS), that enables location-based product-level market structure analysis, using panel data on product assortment and individual consumers' purchases across stores. The outputs from dGPDS can help retailers improve store location strategies as well as location-based product assortment strategies. We apply dPGDS in retail vending because vendors often increase coverage and product variety by installing more vending machines in the same marketplace.

SB07

Virtual Room 07
Digital Marketing II
Contributed Sessions
Chair: Ming Cheng
 Ming Cheng, Suffolk University, Boston, MA

1 - Residual Heterogeneity within Targeted Digital Audiences

Matthew McGranaghan, University of Delaware, Wilmington, DE
Marcel Preuss

Advertisers participate in advertising auctions by choosing a target audience, a bid type (pay-per-impression or pay-per-action), and bid amount, resulting in a reached audience. We show how unspecified and unspecifiable attributes of the reached audience depend not only on the target audience, but also on the bid type and bid amount. Unspecified attributes refer to attributes that the advertiser could have targeted but did not target. Unspecifiable attributes refer to attributes that the advertiser cannot target (e.g., intention to buy). We run novel experiments on a social media platform that allow us to measure the otherwise unobservable composition of a reached audience along unspecified and unspecifiable attributes, and document how bid type and bid amount systematically affect the composition of a reached audience. Optimal bidding in this environment is thus complicated by the bid type and bid amount influencing the value of the reached audience.

2 - Sales Impacts of Live-streaming Video Ads

Zining Wang, University of British Columbia, Vancouver, BC, Canada
Yanwen Wang, Shuai Yang, Hongju Liu

Live-streaming shopping has reshaped E-commerce with the entertaining, immersive and interactive experience it provides. Despite the boom of live-streaming, the sales impacts of live-streaming video ads remain unclear. In this work, we investigate the long-run sales impacts of live-streaming video ads using a large-scale scanner dataset retrieved from a leading online marketplace in China. We estimate live-streaming elasticities for 304 national and international apparel brands. The documented live-streaming elasticities could serve as a reference for practitioners and marketing researchers in the rapidly evolving live-streaming economy. In order to provide generalizable estimates of live-streaming effects, we include fixed effects to control for a range of confounding sources in our model design, and utilize the institutional details of live-streaming video ad scheduling for model identification. Our estimates on live-streaming elasticities are robust, given the adjustment of confounding sources and model specifications. Our empirical analysis

suggests that for about two-third of the brands, live-streaming video ads on E-commerce platforms have significant sales impacts on the promoted products. Given the median brand, a 100% increase in its live-streaming ads tends to increase the current and future sales of its promoted products by 23.9%. In addition, the effectiveness of live-streaming video ads tends to vary by host types. In particular, a 100% increase in live-streaming ads hosted by the median brand's live-streaming channels corresponds to a 29.8% increase in sales, while the sales lift related to star, platform and micro influencers are 17.9%, 11.7% and 8.8%, respectively. The difference in influencer-specific live-streaming effects are likely to be triggered by traits of influencers rather than audience size. Finally, metrics of brand strength, including market share and pricing power, moderate live-streaming effects, such that high market-share brands and affordable brands can get the most out of live-streaming advertising.

3 - The Effects of Price Promotions on New Customer Acquisition for Information Goods

Daniela Schmitt, Nova School of Business and Economics, Carcavelos, Portugal
Rom Schrift, Raghuram Iyengar, Florian Stahl

Can price promotions help firms acquire profitable customers? Research from consumer packaged goods suggests that promotionally-acquired customers have little long-term value. We examine whether this answer holds for price promotions for information goods (e.g., digital newspapers). One notable feature of companies selling such goods is that they employ a dual revenue model - customers pay to access the service and advertisers pay based on customers' consumption. Here, a promotion may still attract customers with low willingness to pay. These customers, however, can become profitable based on their consumption. We empirically assess the tradeoff between lower subscription and higher advertising revenue using individual-level data from a digital newspaper that implemented its first ever price promotion. We find that promotionally acquired customers can be more valuable than those who join at the regular price. We propose self-selection as the main driver of our results.

4 - Beyond Influencers: Impacts of Viewer Herd Behaviors and Sales Assortment on Performance of Livestream Events

Ming Cheng, Suffolk University, Boston, MA
Jane Zhu, Quan Jin

Digital transformation in marketing has profoundly changed the way how brands communicate and interact with customers. Livestream sales events that are hosted by social media influencers and conducted via major social media/e-commerce sites to introduce, recommend a wide variety of

product and service offerings have emerged and become a new digital promotion paradigm (e.g., Amazon Live, TikTok). The idea of integrating social media interactivity between influencers and audiences into an online sales event has turned out to be a popular and successful business model, particularly for companies with focuses in selling intangible, hedonic, and experience-driven offerings.

Drawing from social media influencer and assortment choice literature, we hypothesize that the social impact, as it is exemplified by crowd or herd behaviors in livestream events (e.g., customer's sentiment through likes, comments in a livestream event) could play an important role in influencing a consumer's purchase decision and subsequently, affecting the sales performance of the brands and the influencer. Additionally, we hypothesize that the herd impact could play a stronger impact on consumer purchase decision, especially when decisions that are difficult to justify (e.g., hedonic or service offerings).To empirically test our conceptual framework, we collected a unique secondary dataset from a leading livestream host platform based in China. We employ regression models to test our hypotheses at 1) individual product sales performance and 2) social media influencer fan base growth levels. Empirically, we discovered that, in general, a larger number of likes that a viewer crowd generates during an event contributes to more purchases of individual items promoted at the event. Additionally, herd behaviors have positive impact on hedonic rather than utilitarian offerings, particularly when the assortment size is small. Our empirical findings provide important implications to brand managers and social media influencers.

SB08

Virtual Room 08
ISMS Doctoral Awards
Awards Sessions
Chair: Jiwoong Shin
Yale School of Mangement, New Haven, CT, 06511-8978,

1 - Vithala R. and Saroj V. Rao ISMS Doctoral Dissertation Award

Ziwei Cong, Hong Kong University of Science and Technology, Hong Kong, China
No Abstract

2 - ISMS Doctoral Dissertation Award

Runshan Fu, Carnegie Mellon University, Pittsburgh, PA
No Abstract

3 - Sheth Foundation ISMS Doctoral Dissertation Award
Zheng Gong, University of Toronto, Toronto, ON, Canada
No Abstract

4 - ISMS Doctoral Dissertation Award
Wei Lu, Rotman School of Management, University of Toronto, Toronto, ON, Canada
No Abstract

5 - ISMS Doctoral Dissertation Award
Alexey Sinyashin, UC Berkeley, Berkeley, CA
No Abstract

SB09

Virtual Room 09
Ad Content and Market Outcomes II
Special Sessions
Chair: Hortense Fong
Yale School of Management, Cambridge, CT
Co-Chair: Joonhyuk Yang
University of Notre Dame, University of Notre Dame, Notre Dame, IN

1 - Category Learning through Experiential Product Images
Liu Liu, University of Colorado Boulder, Boulder, CO
Natasha Foutz, Masakazu Ishihara
Consumers face great uncertainly of product content and quality before purchasing experiential products. We hence quantify the impact of product images on sales and post-purchase satisfaction. Specifically, we focus on product images used in advertising and packaging to address the following key questions. (1) Do these images provide typical content information about product contents and categories? And (2) How does the extent of typicality impact sales and post-purchase satisfaction? We empirically examine these questions using a canonical example of experiential products - motion pictures. Analyzing 10,000+ movies' poster images via deep learning image classification models, we link two constructed metrics, product typicality and ambiguity, to box office. We further discuss the substantive and strategic implications of our findings.

2 - Gazing Right: Decoding the Effects of Eye Gaze Directions in Marketing Images with Deep Learning
Eugene Pavlov, University of Miami, Miami, FL

Zhuping Liu, Shuai Yang, Chunmian Ge
Human faces are often used in marketing images to promote products in online e-commerce. The real-world effects of face presence and gaze directions in such contexts, however, have not been studied in the literature. In this paper, we apply scalable deep learning methods to more than a quarter million images across 351 brands to detect face presence and gaze directions and then empirically test their effects on consumer responses. We find positive effects of face presence on consumer clicks but insignificant effects on purchases. However, we find substantial heterogeneity across different gaze directions where right gaze is the only effective direction to drive both more clicks and more purchases. Direct gaze and the other averted gazes increase clicks, but they do not lead to more purchases. Hence, it is important to distinguish between different averted gazes and extend the conventional comparison solely between the averted gaze and the direct gaze. We have also replicated the strong positive effects of right gaze on click and purchase intentions in a controlled experiment and identified curiosity as a potential mediator. Overall, these results demonstrate how scalable deep learning can help extract relevant information from unstructured multimedia content for marketing purposes and that gazing right is critical.

3 - Reputation Burning: Analyzing the Impact of Brand Sponsorship on Social Influencers
Mengjie Cheng, Harvard University, Cambridge, MA
Shunyuan Zhang
The growth of the influencer marketing industry warrants an empirical examination of the effect of posting sponsored videos on an influencer's reputation. We collect a novel dataset of 85,669 user-generated YouTube videos created by 861 prominent English-speaking influencers in the beauty and style category. We extract a rich set of theory-driven features and use DiNardo-Fortin-Lemieux reweighting to construct comparable treatment and control groups that are matched at the influencer-video level. A difference-in-differences analysis on the matched sample finds a reputation-burning effect: a sponsored video, compared to an equivalent organic video, costs the influencer 0.17% of their reputation (operationalized as the number of subscribers). The reputation-burning effect is stronger among influencers with larger audiences; an analysis of likes and comments reveals a larger gap in the audience's response to sponsored vs. organic videos among influencers with larger (vs. smaller) audiences. The reputation-burning effect is mitigated when there is high fit between the sponsored content and the influencer's usual content and when the promoted brand is less well-known. Our study empirically tests an assumption of several theoretical works,

contributes to the literature on influencer marketing and celebrity endorsements, and provides managerial implications for influencers, brands, and social media platforms.

4 - Targeting Digital Ads on Emotional Context

Hortense Fong, Yale School of Management, New Haven, CT

Vineet Kumar, Ravi Dhar

An increasing number of firms are expanding ad targeting services beyond demographic and behavioral variables to contextual variables and in particular emotion. We focus on emotion targeting as an ad targeting strategy given that emotion is known to be one of the most fundamental determinants of human behavior. We ask whether matching ad emotion with context emotion—the emotion elicited by the content where an ad is placed—is an effective ad targeting strategy, as has been suggested in past research, and focus on the emotions of happiness and sadness. In contrast to extant research, we consider the self-selection of emotional content in determining ad effectiveness. In a field study on YouTube, we find that while happy ads are significantly more effective in happy contexts than sad contexts, sad ads exhibit no benefit to matching on context emotion. We quantify the effect of ad-context emotion matching and the effect of content self-selection using a lab experiment. The selection effect overwhelms the emotion matching effect. The results suggest that the benefit of ad targeting on emotion stems from finding individuals who are more receptive to ads based on context emotion.

SB10

Virtual Room 10

Understanding Choices between Brand-name and Generic Drugs

Special Sessions
Chair: Andrew Ching
Johns Hopkins University, Baltimore, MD
Co-Chair: Manuel Ignacio Hermosilla
Johns Hopkins University, Baltimore, MD

1 - Bad Medical News and the Aversion of Generic Drugs

Manuel Ignacio Hermosilla, Johns Hopkins University, Baltimore, MD

Efforts to reduce inefficient healthcare spending are prevalent across the developed world. Among available policy options, the substitution of brand name for generic drugs is of particular interest because it can deliver large savings without objective quality sacrifices. These policies are nevertheless met with resistance from patients, who perceive generic drugs as of relatively lower quality. This article sheds new light on the behavioral underpinnings of such generic averse behavior. We argue that generic aversion can be fueled by an inescapable element of patients' interaction with the healthcare system, i.e., receiving information that unveils a health deficiency. We argue that such bad medical news reduces the patient's risk tolerance, causing a turn from generic drugs due to their higher perceived risk. Supporting evidence is presented from the context of LDL (bad) cholesterol testing, where patients who receive a 130 mg/dL result are assigned to a bad news treatment in a plausibly random way compared to those who receive a 129 mg/dL result. Compared to these control patients, we find that treated patients experience a 1.3% reduction in their propensity to choose a drug's generic option after receiving the LDL result, conversely, an 8% increase in brand name choice propensity.

2 - Biosimilar Entry and the Pricing of Biologic Drugs

Luca Maini, University of North Carolina, Chapel Hill, NC

Unlike small-molecule drugs, biologics cannot be exactly replicated and instead face post-exclusivity competition from inexact copies called biosimilars. Under a stylized model, greater perceived differences between incumbent and entrant can cause incumbents to fight rather than acquiesce. Consistent with this prediction, we find that biologics respond to biosimilar entry in the U.S. market by reducing net-of-rebate prices to maintain volume, in contrast to the well-documented response of small-molecule drugs to generic entry. We exploit variation in biosimilar entry mechanisms created by the 2009 Biologics Price and Competition Act to provide further suggestive evidence that perceived differences drive the observed outcomes.

3 - Quality Regulation and Competition: Evidence from Pharmaceutical Markets

Jose Ignacio Cuesta, Stanford University, Stanford, CA
Juan Pablo Atal

Quality regulation attempts to ensure quality and to foster competition by reducing vertical differentiation, but may also have unintended consequences through its effects on market structure. We study this trade-off in the context of pharmaceutical bioequivalence, which is the primary quality standard for generic drugs. Exploiting the staggered phase-in of bioequivalence requirements in Chile, we show that stronger regulation decreased the number of drugs in the market by 25% and increased average paid prices by 9%. These adverse effects were concentrated among small markets, suggesting that compliance costs played

an important role. We estimate a structural model with endogenous entry and certification to study the role of drug quality, aversion against generics, and certification costs in shaping the equilibrium effects of quality regulation. We find that quality regulation increased consumer valuation of generic drugs through reducing asymmetric information and aversion against unbranded generics, which induced entry of high-quality products in place of low-quality products. Consumer welfare increased despite higher prices and a lower number of firms.

4 - Generic Aversion and Observational Learning in the Over-the-Counter Drug Market

Mariana Carrera, Montana State University, Bozeman, MT
Through a labeling intervention at a national retailer, we test three hypotheses for consumer aversion to generic over the counter (OTC) drugs: lack of information on the comparability of generic and brand drugs, inattention to their price differences, and uncertainty about generic quality that can be reduced with information on peer purchase rates. With a difference-in-differences strategy, we find that posted information on the purchases of other customers increases generic purchase shares significantly, while the other treatments do not. Consumers without prior generic purchases appear particularly responsive to this information. These findings have policy implications for promoting evidence-based, cost-effective choices

SB11

Virtual Room 11
Digital Marketing Strategy
Contributed Sessions
Chair: Jangwon Choi
University of Michigan, Ann Arbor, MI

1 - Dynamics of Spatial Proximity Effect and Consumer Online Shopping Behavior

Meng Ji, Indiana University Bloomington, Bloomington, IN
Jingcun Cao, Shyam Gopinath, Shibo Li
Spatial proximity has been shown to play a significant role in consumers' shopping behaviors in the marketing literature. However, existing literature mainly focuses on consumer new product adoption while other dimensions of consumer purchasing behaviors are largely ignored. In addition, the dynamics of spatial proximity effect, the multi-dimensional nature of spatial proximity, and its heterogeneous impact remain understudied. Based on social influence theory and social identity theory, we examine these research questions using a unique dataset from the top shopping website in

Hong Kong. Our study shows that non-cumulative consumer density and cumulative consumer density have an opposite impact on consumers' online purchasing behavior (when and how much to buy), and such an effect is dynamically changing over time. Further, there exists significant heterogeneity across different product categories and consumers. Our proposed framework also allows us to identify the drivers of the dynamic spatial proximity effect. As a result, this study provides novel findings on the dynamics and heterogeneity of the spatial proximity effect and offers important theoretical and managerial implications for marketing researchers and managers.

2 - Modeling the Short vs. Long-run Dynamics of Variety-seeking vs. Inertial Preferences for Experiential Products

Liangbin Yang, Syracuse University, Syracuse, NY
Joy Lu
Existing models that capture variety-seeking vs. inertial consumption behaviors often assume that these behaviors are time-invariant and don't change throughout the consumption journey. We relax this assumption and develop a novel model that flexibly allows variety-seeking and inertial behavior to be time-varying and differ in the short vs. long run, and apply our model to data on a large set of players of an online video game. For example, a player may exhibit inertial preferences by choosing to play the same game options (e.g., a map environment, game objective) persistently in the short run, but exhibit variety-seeking by switching among different options in the long run. Our empirical analysis demonstrates that a significant proportion of players exhibit different variety-seeking and inertial behavior in the short and long run. We further show that allowing time-varying preferences can reduce biases in predicting player preferences, as well as improve the explanatory and predictive power on playing behaviors.

3 - Pay Now vs. Free Later: Investigating the Impact of a Consumption-decelerating Promotion on a Serialized Digital Media Platform

Jangwon Choi, University of Michigan, Ann Arbor, MI
Inyoung Chae, Fred M Feinberg
Promotions for digital goods have typically focused on enticing users to consume more, commit for longer, try more varieties, but above all on acceleration: incenting content consumption immediately or during a tight time window. Here, we investigate the effects of a novel promotion, Wait Until Free (WUF), that is uniquely consumption-decelerating. WUF can be potentially profitable for a variety of reasons, chief among them its application to serialized digital content,

that is, distinct series broken up into successive episodes. Specifically, customers can sample novel content for free, and can continue to do so by waiting a fixed time; or, for those unwilling to wait, by paying. WUF thus exploits heterogeneity in intertemporal substitution utility, but can also entail both spillover (increased, profitable consumption of non-treated series) and a variety of cannibalization artifacts. Analysis of a dataset from an online platform for internet comics suggests that the WUF promotion can in fact boost paid readership for the treated series, and also at the platform level even when cannibalization from other untreated series is accounted for, when applied to the right set of comics. Using a combinatorial genetic algorithm, we efficiently search through sets of series that maximize paid viewership over time windows of different lengths, finding that the genres and popularity of chosen content can change based on planning horizon. Finally, to understand individual user-level substitution effects, we employ a Cox proportional hazards model to identify consumption stickiness for episodes within-series and switching behavior across-series, and how these are affected by the WUF promotion.

SB12

Virtual Room 12
Multi-channels II
Contributed Sessions
Chair: Hoorsana Damavandi
Western University

1 - Strategic Media Planning for New Products: Channel Substitution and Synergy

Vahideh Sadat Abedi, California State University Fullerton, Orange, CA
Oded Berman, Fred M Feinberg, Dmitry Krass

New product and service introductions require careful joint planning of production and marketing campaigns. Consequently, they typically utilize multiple information channels to stimulate customer awareness and resultant word-of-mouth (WOM), availing of standard budget allocation tools. By contrast, when enacting strategic allocation decisions - which must align with other management imperatives - dividing expenditures across channels is far more complex. To this end, we formulate a multi-channel demand model for new products (or services), amenable to analysis of inter- and intra-channel interaction patterns and with the word-of-mouth process, without building such interactions directly into the modeling framework. We propose a novel decomposition of the multi-channel dynamic programming problem into two distinct tiers: the strategic

tier addresses how to allocate total expenditure across channels, while the tactical tier studies how to allocate the channel-specific budgets (determined in the strategic tier) over time periods. This decomposition enables optimal media strategies to sidestep the curse of dimensionality and renders the model pragmatically estimable. The model provides actionable managerial insights into when, and which, channel interactions are synergistic vs. substitutive. Specifically, a channel's interactions are governed primarily by its own leverage (potential demand impact) and the WOM-based demand momentum (market penetration) it can generate, affording a novel basis for channel typography and firm action. The modeling framework is illustrated by examining camera sales for two media channels (FSIs and radio) and their effects over 28 months.

2 - Shipping Subscriptions in B2B: Multichannel Demand Implications

Baris Kocaman, Eindhoven University of Technology, Eindhoven, Netherlands
Sarah Gelper, Fred Langerak, Tom Van Woensel

Following the recent uptake of subscription-based shipping services in B2C online channels, omnichannel sellers in business markets are increasingly offering shipping subscription programs to survive in the competitive digital landscape. However, B2B channel management is typically more complex than B2C owing to the salesperson channel, which leaves businesses unsure about the effectiveness of such programs and how they fit with their omnichannel ambitions. We address this problem by studying the multichannel demand implications (purchase value, frequency, variety, and basket size) of a shipping subscription program in a B2B setting. Using data from a global B2B high-tech tools manufacturer and a synthetic control approach, we demonstrate strong differences in the effect of the subscription program across channels. While subscribing to free shipping does not increase purchase value, it increases purchase frequency, variety, and the share of purchases in the salesperson channel. In the online channel, we do not observe significant changes except a smaller basket size. In the store channel, we do not observe any significant changes. The study's results offer guidance for omnichannel sellers on managing subscription programs in B2B multichannel environments. Specifically, since the salesperson channel is also the costliest, it is recommended that sellers manage salesperson response proactively.

3 - The Spillover Effect of Product Defects in Buyer-supplier Networks

Hoorsana Damavandi, Ivey Business School, Western University, London, ON, Canada

Kersi Antia, Vivek Astvansh, Stefan Wuyts

Product defects are a common occurrence in buyer-supplier relationships, typically resulting in a decline in the dollar value of the at-fault supplier's relationship with the affected buyer. The present study assesses the spillover effect of a supplier's product defects on its relationship with its other non-affected buyers. Building on the problem-solving framework in operations management, the authors hypothesize how this spillover effect may be strengthened or weakened by the information available to these other non-affected buyers regarding the problem underlying the defect and its available solutions. They conceptualize problem-related information as being available from the Simmelian ties (cliques) involving the focal non-affected buyer, the at-fault supplier, and other buyers/suppliers in the network. In contrast, the authors expect non-affected buyers to infer the availability of solutions from the number of tier-2 suppliers the at-fault supplier has ties with. They expect more information about the problem (solution) to exacerbate (attenuate) the negative spillover effect, and importantly, for these effects to be nonlinear. Relying on a data set comprising a multi-tier network of relationships among 13 automotive manufacturers, their 111 tier-1 suppliers, and 1927 tier-2 suppliers observed over two years, the authors estimate a significant decline in the value of an at-fault supplier's relationship with its non-affected buyers. They also provide evidence of clear nonlinear strengthening and weakening effects for Simmelian ties and the at-fault supplier's count of tier-2 suppliers respectively. These findings contribute to the nascent yet growing body of knowledge on multi-tier buyer-supplier networks in marketing.

SB13

Virtual Room 13
Reviews
Contributed Sessions
Chair: Nah Lee
Duke University, Fuqua School of Business,
Durham, NC

1 - Can Online Reviews Improve Quality? The Effect of Tripadvisor Adoption and Hotel Quality

Yang Wang, Temple University, Philadelphia, PA
Alexander Chaudhry, Amit Pazgal
In this study, we use a game theoretic model to argue that the presence of online reviews can lead to product quality improvements for independent firms selling experience goods. Exploiting heterogeneous review platform penetration across markets, we test the predictions of our model using a dataset covering 40 thousand U.S. hotels and show that markets with greater TripAdvisor penetration exhibit greater gains in independent hotel quality. Independent hotels located in median peak penetration TripAdvisor markets improved their quality by an average of .129 stars as measured using composite online travel agent (OTA) star ratings, erasing 41% of the advantage held by chains in the absence of online reviews. We address measurement noise challenges for quality and platform penetration using state space models to reveal persistent quality and platform penetration trends. Additionally, we resolve endogeneity due to potential unobserved confounds correlated with penetration and quality across markets and time. We do so by exploiting review platforms' imperfect market definitions that divide areas of hotel agglomeration into separate review platform markets, thus quasi-exogenously assigning hotels in the same area to varying levels of online review exposure. Our research suggests that online reviews play an important role in facilitating competition on quality.

2 - How Consumers Respond to the (in)Consistency between Product Ratings and Review Sentiments: A Cross-cultural Study of UGC in the US and China

Ning Fu, Assistant Professor, California State University, Northridge, Northridge, CA
Qi Wang, Chang Hee Park
While various findings have been presented in the literature regarding the impact of consumers' product reviews, early studies have focused on the explicitly observed characteristics of UGC such as numeric product ratings, the number of replies, and the popularity of reviewers. However, when consumers process product reviews, they not only read numeric ratings but also sense sentiments and emotions expressed in review texts. Accordingly, it is important for firms to understand how consumers' subsequent decision-making and behavior are jointly influenced by the two unique sources of information conveyed in UGC. Another important question of interest arises as to whether and how the impacts of product reviews would vary depending on consumers' cultural background. Given the globalization of consumer markets and the growing popularity of online review platforms, consumer reviews for the same product have become increasingly available across different countries. Understanding such cross-cultural differences in consumer responses is essential for firms to effectively manage UGC platforms for consumers' product reviews across global markets. This research investigates (1) the joint impact of numeric ratings and review sentiments in prior product reviews on consumers' product evaluations and (2) how this impact varies between individualist and collectivist cultures.

Using data about 115,231 movie reviews collected for 167 American movies released both in the US and China, the authors find that the joint impact of movie ratings and review sentiments varies with the consistency between these two information sources, as well as their valence. Furthermore, their analysis reveals that the joint impact differs between the two cultures. The authors suggest that these findings may arise because consumers' perception of information credibility varies depending on the information consistency and their cultural background. The findings offer important implications for firms in managing UGC platforms for consumers' product reviews and social media across global markets.

3 - Which Consumer Reviews are More Influential: The Effects of Friendship and Home Bias on Subsequent Reviews

Ruoding Wang, Nanyang Business School, Nanyang Technological University, Singapore
Eunsoo Kim, Xinlong Li

Online consumer review (OCR) is an important source of product information. With the widespread practice of OCR platforms presenting reviews from friends along with consumer location information, we investigate how prior reviews from friends affect the contents of subsequent reviews and whether home bias exists in the review contents. Leveraging Yelp review data from 118 cities in North America between 2006 and 2018, we employ a Naïve Bayes algorithm and hybrid matching method that combines propensity score matching (PSM) and Mahalanobis distance matching to estimate the friendship and home bias effect on the content similarity. The approach is taken to resolve the endogeneity problem that similarity among review contents from friends or reviewers from the same city can be attributed to commonalities among friends or consumers from the same city. This study shows superior performance of the hybrid matching method compared to the Mahalanobis distance matching and the PSM respectively. We find that subsequent review contents converge to the review contents from friends for a given restaurant. By estimating a causal forest, we show that reviews from certain types of users are prone to home bias. This research expands the social influence literature on the contents of online reviews and provides insight to OCR management.

4 - Hospital Reviews, Clinical Quality of Care, and Providers' Response

Nah Lee, Duke University, Fuqua School of Business, Durham, NC
Richard Staelin

Despite the surging increase in the public awareness and usage of online patient reviews for healthcare services, little is known about how these reviews affect healthcare provider's behavior. To this goal, we study the clinical performance of 2,773 U.S. hospitals in recent years when reviews are widely available and examine how it has changed compared to the performance in the pre-review era. To this end we analyzed over 300k Google reviews. Our overarching premise is that multiple measures of patient reviews, including the content focus of the reviews (i.e., clinical or non-clinical), and the valence and variance of the content, may influence hospital manager's decision on the quality of care provided. Of particular interest is the heterogeneity of hospital responses across covariates such as the hospital's characteristics, patient socio-demographic variables, and the degree of competition facing the hospital. Using an exploratory data analysis approach and a diff-in-diff design and causal forests, we identify a number of variables that influence the impact of review variables on hospital's performance including the helpfulness of the reviews, competitive intensity, hospital size, and education level and age of the population the hospital serves. Interestingly, provider type, ownership structure, and whether or not the hospitals write response comments to the online reviews did not materially influence the association between review variables and changes in hospital performance. We offer insights on how the impact of the review variables is affected by meaningful covariates.

SB14

Virtual Room 14
Marketing Models and Applications
Contributed Sessions
Chair: Yuhan Lin
Wealthfront

1 - The Value of Referral: Referral and Purchase in Direct Selling

Maiju Guo, Peking University, Beijing, China
Qiaowei Shen, Hongju Liu

Referrals have been detected as the most important source of gaining new customers. Direct selling firms offer an opportunity for existing consumers to become producers after making successful referrals and track the referral provider and referral receiver relationship more accurately. Such firms' performance critically depends on the purchase and referral performance of existing customers, which determines the customer's overall contribution margin. This paper examines the role of referral in interactive and dynamic business settings. Using a novel data set from a large direct selling

company, we construct four focal variables-referral provider's and receiver's referral and purchase, respectively. To account for the possibility that the focal variables influence each other, we estimate a panel vector autoregression model on data at the month level from 4677 users. The results suggest that users' referral strengthens their purchase, but their purchase has no significant impact on referral. In addition, users' referral boosts more referral and purchase of their referred users. Moreover, users' purchase negatively impacts the referral but not the purchase of their referred users. Our results shed important managerial insights on how platforms can optimize marketing interventions such as referral encouragement and quantify customer referral value.

2 - Network Effects and Imperfect Competitor Information

Paul Parker, University of Kansas, Lawrence, KS
This paper investigates how uncertainty about the size of competitor networks affects firms' pricing decisions. In network industries, consumers making purchase decisions oftentimes consider the number of direct contacts that have already purchased the product. In the telecommunications industry, for example, a consumer would be more inclined to choose the carrier already adopted by family and friends. When making pricing decisions firms must therefore consider a prospective customer's connections to its own network and the connections to rival firms' networks. However, firms face uncertainty in that the exact number of connections to a rival network is often unknown. Using a dynamic duopoly model of price competition, this paper finds that under mild uncertainty firms price aggressively to tip the market in their favor, after which they price high. Under high uncertainty, firms settle into an equilibrium where prices are low. This has the effect of decreasing market concentration and decreasing average prices.

3 - Estimating View-through Ad Attribution from User Surveys using Convex Optimization

Yuhan Lin, Wealthfront, Palo Alto, CA
Rohan Kekatpure, Cassidy Yeung
In Digital Marketing, robust quantification of View-through attribution (VTA) is necessary for evaluating channel effectiveness. VTA occurs when a product purchase is aided by an Ad, but without an explicit click (e.g. a TV ad). A lack of a tracking mechanism makes VTA estimation challenging. One prevalent technique uses a post-purchase in-product user survey to estimate VTA. User surveys enable the calculation of channel multipliers, which are the ratio of the View-through to the Click-through purchases attributed to

each marketing channel. Channel multipliers provide a way to estimate the unknown VTA for each marketing channel from its known click attribution.

In this work, we use Convex Optimization to compute channel multipliers in a way that enables a mathematical encoding of the expected channel behavior. Large fluctuations in channel attributions often result from overfitting the calculations to user surveys. Casting channel attribution as a Convex Optimization problem allows an introduction of constraints that limit such fluctuations. The result of our study is a distribution of channel multipliers across the entire marketing funnel, with important implications for marketing spend optimization. Our technique can be broadly applied to estimate Ad effectiveness in a privacy-centric world that increasingly limits user tracking.

Saturday, 11:30am–12:30pm

SC01

Virtual Room 01
Search: Theory and Evidence
Contributed Sessions
Chair: Zhang Qiang
The Chinese University of Hong Kong, Shenzhen (CUHK-SZ), Shenzhen City, China

1 - Sponsored Search Auction and the Revenue-maximizing Number of Ads Per Page

Pallavi Pal, Stevens Institute of Technology, Hoboken, NJ
In this paper, I derive a new method to identify the distribution of the advertiser's ad-value in the sponsored search auction, explicitly looking at weighted Generalized Second Price auction. Compared to previous literature, this method incorporates a weaker and more realistic assumption of incomplete information. Additionally, I evaluate how much the advertisers shade their bid below their value, defined as bid shading amount. The results show that the bid shading is minimal; the 50th percentile of the bid shading upper bound is below 0.2% of their value. The low amount of bid shading is due to a high level of competition in the online ad market. Additionally, I apply the derived distribution to look at the effect of externality on the search engine's revenue from ads. Firms use advertising as a medium to gain a competitive advantage, which is negatively affected if the ad appears alongside their rival's ad -- a form of externality. I estimate a structural model based on a novel data set of Yahoo! ads to quantify the effect of externality on an advertiser's value and then simulate the revenue-maximizing number of ads. I find that externality depends on the quality and quantity

of competing ads. For example, in the laptop category, an advertiser's willingness to pay decreases by thirty-two percent due to the addition of a second high-quality ad, but only by eleven percent due to a low-quality ad. Furthermore, the counterfactual results suggest that the revenue-maximizing number of ads per page differs across the ad product category, with five ads per page on average. Implementing the recommended number of ads would lead to, on average, a 4.5 percent increase in revenue. These results provide evidence supporting the recent changes in the online advertising market; for example, Microsoft introduced a service called RAIS that provides advertisers with an option of an exclusive ad display.

2 - Modeling Consumer Sequential Search with Refinement and Click-stream under the Lexicographic Rule

Xuewen Wang, Hong Kong University of Science and Technology, Hong Kong
Jia Liu

The increasingly available data on consumer online search behavior (such as clicking, sorting, and filtering search results) offers researchers and practitioners valuable information for preference measurements and for improving personalized marketing strategies. This has triggered a series of studies that develop structural models of consumer search for policy simulations. These models often assume that every consumer considers all attributes and the values of different attributes could compensate each other, i.e., the compensatory decision rules. These assumptions are not only unrealistic, but also make it very difficult to fully integrate data on consumer usage of search refinement tools, as consumer preferences to product attributes are not explicitly linked to their choices of filtering/sorting keywords. The recent literature suggests that refinement tools have crucial implications on consumer search and purchase behavior, and hence the design of online platforms. Therefore, it is important to relax these modeling assumptions and to be able to take full advantages of consumer search data.

We aim to address these research challenges by developing a unified sequential search model with learning in which consumer decisions on search (including clicking, keyword filtering, and sorting) and purchase are derived from utility maximization under non-compensatory decision rules (i.e., the lexicographic rule). A non-compensatory utility framework allows us to explicitly model which keyword(s) consumers choose to filter or sort in this decision process. Thus, we can conduct counterfactual analysis on the impact of changing available keywords in the filtering or sorting lists on consumer search and purchase behaviors. We estimate the proposed model on a large data set, consisting of consumer search

histories (including clicking, keyword filtering, sorting, and purchase) for hotels on a major web-based hotel comparison platform. We document that our model combing consumer usage of search refinement tools could better estimate consumer preferences in the search process.

3 - A Theory of Customer Search across Multiple Platforms

Mohammad Zia, Chapman University, Orange, CA

We investigate customer search and purchase behavior across multiple platforms (such as Amazon, Best Buy, or eBay), each of them hosting several bands. Customers may engage in costly searches within or across platforms to resolve their uncertainty about product prices and match. Some customers are loyal to one platform, while others may cross-search across platforms. We find that when platform loyalty decreases and customers become more willing to search across platforms, equilibrium prices fall, and customer purchases increase. Interestingly, we show that the impact of cross-searching on profits depends on the magnitude of search costs; cross-searching negatively impacts profits if the search cost is low, but it positively impacts profits if the search cost is high. We further examine how platform asymmetries (in terms of customer loyalty or brand quality) impact customer search, brand pricing, and profits.

4 - Modeling Dynamics in Sequential Search: The Effect of Product Recommendation Networks on Online Consumer Search and Purchase

Qiang Zhang, Marketing Department, The Chinese University of Hong Kong, Shenzhen (CUHK-SZ), Shenzhen, China
Yi Zhao

A ubiquitous phenomenon in online commerce is that products are often hyperlinked through product-page recommendations, constituting a product recommendation network. These visible recommendation links could create dependence in the consumer search process such that searching one product may bring the recommended products closer to the consumer. This research proposes a structural model of consumer search and purchase in a product network allowing the search costs to change with the visible recommendations during the search process. In contrast with existing models that describe consumer search among a list of products, the proposed model describes consumer search dynamics inside a product network. We further propose a novel Bayesian Markov Chain Monte Carlo (MCMC) procedure to estimate the search model, avoiding high-dimensional integration and producing meaningful estimates of individual parameters. We apply the model to customer-level clickstream and transaction data from a durable category

in a large e-commerce platform. After properly controlling the endogeneity of the recommendation system, we quantify the economic value of sponsored recommendation links on product detail pages and infer the impact of alternative product recommendation strategies on welfare and revenue.

SC04

Virtual Room 04
Retailing and E-Commerce
Contributed Sessions
Chair: Bing Bai
Washington University-St Louis, Saint Louis, MO

1 - Has the COVID-19 Pandemic Made Online Shoppers Less Price Sensitive? Evidence from Amazon Lighting Deals

Bingyang Fang, Binghamton University, Binghamton, NY Chang Hee Park, Subimal Chatterjee

We examine how the Covid-19 pandemic, that has severely restricted offline shopping, has changed consumers' online shopping behavior in (a) their price sensitivity and (b) their reliance on quality cues. Our data covers 4,911 Lightning Deals offered by Amazon.com from December 2019 to September 2020, where consumers are enticed with deep discounts on a limited-stock promotion and have to decide quickly (e.g., 50% off in the next 24-hours, 25 left in stock). We split the data into a pre-Covid (from Dec.2019 to Feb.2020) and Covid (from Jul.2020 to Sep.2020) phase and examine how a focal product's original price and discount offered (price features) along with the product ratings and number of customer reviews (quality features) affect the deal's final claim percent (% of stock sold when the deal ends) across the two periods. We analyze the data using fixed-effect regression models and the Gaussian copula method to deal with the potential endogeneity of the price and discount rates. Our analysis shows the expected positive association of the final claim percentage with all four variables. However, we find that the advent of Covid significantly weakens the discount-rate to claim-percent relationship (showing less sensitivity to price) and strengthens the number-of-reviews to claim-percent relationship (showing more reliance on peer-generated buzz). We discuss the implications of our findings for retailers' promotion management in a post-pandemic future.

2 - Effects of Mobile Adoption on Two-sided Online Platforms Performance: A Case of Modern Indian Art Auction

Harish Reddy Singi Reddy, Texas Tech University, Lubbock, TX

Mayukh Dass, Piyush Kumar

With the digitization of the marketplace, many marketing exchanges are now being supported by two-sided online platforms. These platforms such as Amazon, eBay, and so on provide an efficient and effective place for buyers and sellers to exchange goods and services. As these two-sided platforms have been in business for decades, they have been evolving both in terms of functionality and features in coordination with the development of innovative technology. In this paper, we examine the effects of mobile bidding features on revenue generation and bidder behavior on a two-sided online auction platform that sells Modern Indian Art. Using bidding data from 2000-2021 on sales of 10,772 Modern Indian Art items, we explore two research questions: (1) how offering mobile bidding feature impact revenue for the auction house, and (2) how do mobile bidding change bidder behavior in terms of bidding volume, bidding speed, and bidding amount, and bidder competition. Results show significant effects of mobile technology adoption on platform performance and bidder behavior. The paper concludes with suggestions for auction house managers on how to adjust their product offering to maximize their revenue.

3 - Social Movements, Identity and Gender Stereotypes: How did #metoo Affect Footwear Consumption?

Clement Bellet, Assistant Professor, Erasmus University Rotterdam, Rotterdam, Netherlands

We examine whether and how #MeToo—a preeminent global social movement against sexual abuse and harassment—affected consumer demand for products displaying traditional markers of femininity in the footwear market. To do so, we analyzed comprehensive high-frequency product-level stockout data from a leading global fashion retailer spanning 5.2 million observations from January 2017 to December 2018 in 32 OECD countries (covering 89% of the population of OECD members). Using a triple-difference strategy over time, across countries, and between product attributes, we found that #MeToo reduced product-level stockouts along two major design dimensions traditionally associated with femininity: colors (pink or red shoes) and form (slim shapes and heel height emphasizing silhouette and gait). Consistent with a demand-side effect, we find no evidence of short-term supply-side changes in reaction to #MeToo (e.g., changes in product assortments). Local heightened sensitivity to identity threat after #MeToo—captured by online searches around sexual harassment—is consistent with the documented effect. We discuss the results' implications for firms' communication strategies as they relate to customer identity, as well as for our understanding of the role of social movements in shaping signaling dynamics in the marketplace.

4 - The Value of Logistic Flexibility in Online Retailing

Bing Bai, Washington University in St. Louis, St. Louis, MO
Tat Y Chan, Dennis J Zhang, Fuqiang Zhang

In recent years, improving shipping speed in online retailing has faced significant diminishing marginal returns and significant cost increases. As a consequence, many online retailers have started to explore improving other aspects of the shipping experience to attract customers. In this paper, we use the introduction of local pick-up stations by Alibaba to study the impact of improving logistic flexibility on online retailing. We find that the impact of pick-up stations on order frequency is 3.1%, which also drives GMV to increase. Though past literature focuses on shipping speed in e-commerce logistics, we show that the speed effect is not the driving factor on the impact of pick-up stations. Instead, the flexibility introduced by pick-up stations mediates the sales impact. To examine customers' preferences on e-commerce logistics, we develop a choice model to study how logistic flexibility affects customers' purchase decisions. We find that customers value two types of logistic flexibility -- the value of time flexibility, which offers them the flexibility to receive their packages in their most preferred time; and the value of choice flexibility, which offers them the flexibility to make pick-up choices until the last minute to accommodate time uncertainty. We also find that to increase customers' value of logistic flexibility, the platform can reallocate non-pickup orders' delivery time window within districts, which would further boost order frequency.

SC05

Virtual Room 05
Platforms II
Contributed Sessions
Chair: Clarice Zhao
University of Toronto, Toronto, Canada

1 - Sharing Bike-sharing and Car-sharing: An Empirical Analysis

Yiqi Li, Ross School of Business, University of Michigan Ann Arbor, Ann Arbor, MI
Puneet Manchanda, Emanuel Schuster, Martin Spann

Bike-sharing and car-sharing are important components of the Sharing Economy. However, it is not clear whether these two are complements or substitutes. Using data from a company that offers both modes (though under different brands), we propose a Nested-Logit structural approach to analyze how nearby cars (bikes) affect bike (car) sharing demand at the station-level. Besides, we also examine the behavior of individuals who use both car-sharing and bike-sharing. The results show that more cars (bikes) reduce the bike (car) sharing demand nearby, especially for car-sharing. Overall, our results suggest that bike-sharing and car-sharing are substitutes to each other respect to the number of bookings. Our findings are likely to be helpful to sharing economy companies, city planners and policymakers.

2 - Exclusive Strategy in Content Platforms: The Role of Consumer Preference Distribution

Tengfei Guo, Tianjin University, Tianjin, China
Peng Wang

Exclusive contracts are widely introduced by content platforms to prohibit their content providers from dealing with other rivals. We develop a game-theoretical model to examine both the determinants and the consequences of exclusive vs. non-exclusive contracts in platform competition. While existing literature on platform competition typically assumes uniform consumer preference distribution, our analysis highlights the significance of consumer preference distributional forms. By relaxing the uniformity assumption, we obtain several important findings. First, we show that whether exclusive or non-exclusive equilibrium occurs depends critically on the shape of consumer preference distribution: When consumer preference distribution is sufficiently concentrated, exclusivity always arises as the equilibrium outcome; while when the distribution is sufficiently polarized, the content provider always serve both platforms in the equilibrium. More interestingly, when the dispersion level of consumer preference distribution is intermediate, both exclusivity and non-exclusivity equilibria are possible depending on the value of the focal content. Second, regarding the value of potentially exclusive content, we show that under either exclusive or non-exclusive equilibrium, platforms cannot benefit from the high valuation of the content. Third, we show that exclusivity may hurt both platforms, even for the one who wins the exclusive content. Finally, we identify the conditions when the mere existence of exclusive contracts increases the user benefits, suggesting that banning exclusive contracts may not always lead to the most desirable outcome. Our findings enrich the understanding of platform competition and provide practical insights for both platform owners and policymakers.

3 - A Structural Life Course Model of Dynamic Role Selection for a Q & A Platform for Pregnancy and Childbirth

Masakazu Ishihara, New York University, New York, NY
Hiroshi Kumakura

The success of Q&A platforms depends largely on how quickly users can obtain answers for their questions, which in turn depends on the pool of users who can provide answers. Often, users in the pool are those who acquired knowledge from other users on the platform. Thus, to maintain active interactions among users, it is important for Q&A platforms to motivate users who acquired knowledge from the platform to respond quickly to the questions posted by other users. This paper investigates this issue in a popular Q&A platform for pregnancy and childbirth in Japan, where many users who are pregnant for the first time engage in both asking and answering questions as their knowledge and experiences evolve over the course of pregnancy. We first propose a structural model of two-sided markets where users endogenously choose which side to participate based on the issues they face and their evolving knowledge set. We then collect data for all the questions and answers posted on the website between Jan. 2019 and Jul. 2021. To evaluate the issues asked by users on the platform, we apply the Latent Dirichlet Allocation and classify questions into 100 interpretable topics. We find that different issues arise at different points during pregnancy. We then estimate the proposed model using data from first-time pregnancy users. Our finding suggests that users who obtained more answers to their past questions are more likely to provide an answer in the future. Using the structural estimates, we run a counterfactual experiment where we increase the probability of matching a question with users who have the knowledge to answer by 1% and evaluate its impact on the number of answers. We find that on average, the number of answers increases by 2.3%, and this impact varies across topics.

4 - The Consumption of Serial Media Products and Optimal Release Strategy

Clarice Zhao, University of Toronto, Toronto, ON, Canada
Nitin Mehta, Mengze Shi
This paper studies the impact of a platform's product release strategy on the consumption of serialized media content and the ensuing profits. Releasing all the content of a series simultaneously or sequentially can lead to distinctive consumption patterns and different levels of purchases in the long run. We develop a two-stage structural model where consumers decide whether to visit the platform in the first stage and which books/chapters to purchase in the second stage. We estimate the model with data from a leading online publishing platform where writers upload their books chapter-by-chapter over several months. Our estimation results show that a slower release speed, while limiting binge consumption and henceforth lowering short-term consumption (i.e., the binge consumption effect), leads to an increased exploration of other books (i.e., the product exploration effect) through a combination of two mechanisms - the consumers visit

the platform more often and the consumers explore other books due to the constrained availability of the focal books. Our counterfactual analysis explores the performance of alternative release strategies including a hybrid of simultaneous and sequential releases. The results point to the direction that the platform can improve its sales revenue by implementing an optimized hybrid release strategy.

SC06

Virtual Room 06
Machine Learning and Personalization I
Contributed Sessions
Chair: Yuyan Wang
Google, Cupertino, CA

1 - Measuring Curiosity Trigger in Recommendations: A Deep Learning-based Curiosity-inducing Strategy in Recommender System

Pan Li, New York University, New York, NY
Alexander Tuzhilin
Consumer curiosity is an important topic in the psychology and marketing literature that constitutes a crucial factor for modeling consumer decisions, and curiosity-trigger strategy has shown to be effective across many marketing applications. However, it has yet to be adopted in the design of recommender systems, due to the complexity of recommendation tasks as well as computational reasons. In this paper, based on the information gap theory, we propose a novel deep learning-based model to measure the information gap during the recommendation process and quantify the level of curiosity trigger in each recommended product. Based on the measured curiosity trigger, we subsequently construct a curiosity-aware recommender system that adopts the curiosity-inducing strategy. Through extensive offline experiments conducted on three different applications, we demonstrate that the proposed curiosity-aware recommender system significantly outperforms state-of-the-art recommendation baselines, illustrating the importance of curiosity-trigger strategy in recommendations. Furthermore, we conduct a large-scale online controlled experiment at Alibaba, where our proposed model outperforms the latest product system in the company by 25% in terms of multiple business metrics. We find out that it is most effective to incorporate a medium level of curiosity trigger in recommendations to create enough knowledge gap for consumers to stimulate their curiosity, without pushing them into the realm of receiving irrelevant recommendations. In addition, treatment effects are heterogeneous among

different groups of consumers and it is important to model personalized consumer preferences when adopting the curiosity trigger strategy. Our proposed model is highly flexible and scalable in its practical use across various recommendation scenarios. Due to the significant economic impact demonstrated in this paper, our presented model has been deployed at Alibaba serving the short-video streaming application since February 2020.

2 - Toward a More Data-driven Product Design: An Integrated Machine Learning Approach

Zijing Hu, Texas A&M University, College Station, TX
Venkatesh Shankar

To attract new customers and retain old customers, firms need to make key product design decisions about which features to include in the goods and services they offer to customers. As products are becoming increasingly complex, firms face challenges in deciding which product features to include or/and improve using readily available structured and unstructured data. To assist managers in making these decisions, we address the following research questions: (1) How can we extract the different dimensions of consumer preferences and product features from structured and unstructured data on consumer evaluation of product purchases? and (2) What product features contribute most to market share? We propose an integrative machine learning approach that uses data on product ratings and reviews. We use neural collaborative filtering, bidirectional encoder representations from transformers, and convolutional neural network to extract the latent factors and consumer attention links from product ratings and reviews at Amazon. We then link the latent factors to purchase through a market response model. These interpretable factors and the results from the market response model combine to provide a deeper understanding of the relationships between product features and market share. Our research contributes to the literature in important ways. First, we extend the research on product design, collaborative filtering, deep learning, and natural language processing by developing an integrative analysis of structured and unstructured data. Second, our approach helps managers develop better product designs by identifying the salient product features. Third, we offer a scalable and readily implementable data-driven approach to product design based on easily accessible data.

3 - Real-Time Personalization

Hong Deng, Erasmus University Rotterdam, Rotterdam, Netherlands
Bas Donkers, Dennis Fok

Real-time personalization engines enable effective customization in e-commerce. Yet, the development of such engines is not trivial. It remains challenging to optimize across many options, especially while utilizing context information in real time. To meet these challenges, we aim to provide an easy-to-implement personalization engine to support online retailers and marketers in making fast adaptive decisions. We formalize the personalization problem under the multi-armed bandit framework, and propose a new contextual bandit algorithm based on the particle-filtering technique. Our method allows firms to flexibly introduce new personalized options, calibrate their impact using prior knowledge from historical data and rapidly update these prior beliefs as new observations arrive. With an application to news-article recommendation, we show that the proposed method achieves a Click-Through-Rate (CTR) of 5.23%, outperforming the state-of-the-art methods like UCB-1 and LinUCB that achieve a CTR of 4.53% and 4.82%, respectively.

4 - Recommending for a Multi-sided Marketplace with Heterogeneous and Hierarchical Contents

Yuyan Wang, Google Brain, Mountain View, CA
Long Tao, Xian Xing Zhang

Many personalization platforms today are a multi-sided marketplace consisting of consumers, merchants and other partners, with the contents being heterogeneous and even hierarchical. For a recommender system to be successful in these contexts, it faces two main challenges as described below. First, each side in the marketplace has different and potentially conflicting utilities. Recommending for a multi-sided marketplace therefore entails jointly optimizing multiple conflicting objectives. Second, the off-the-shelf recommendation algorithms are not applicable to the heterogeneous and hierarchical content space, where a recommendation item could be an aggregation of other recommendation items. In this work, we develop a general framework for recommender systems in a multi-sided marketplace with heterogeneous and hierarchical contents. We combine machine learning with multi-objective optimization for the multi-sided marketplace, and incorporate structural modeling for user scrolling patterns for the heterogeneous and hierarchical contents. Our proposed structural modeling approach ensures consistent user experience across different levels of aggregation of the contents, and provides levels of transparency to the merchants and content creators. We further provide theoretical insights on the Pareto frontier among multiple objectives under our framework, and develop an efficient optimization solution for ranking and recommendation in large-scale online systems in real time. We implement the framework at Uber Eats, the personalized food delivery service by Uber and one of the largest food delivery platforms in the world, which is a three-sided marketplace consisting

of eaters, restaurant partners and delivery partners. Online experiments demonstrate a significant increase in user conversion (+1.5%), retention (+0.7%) and gross bookings (+0.5%), which combined translate to $2.4M weekly gain in gross bookings. Our work has been deployed globally as the recommendation algorithm for Uber Eats homepage.

SC07

Virtual Room 07
Digital Marketing and Commerce
Contributed Sessions
Chair: Weiqing Zhang
New York University

1 - Online Review Helpfulness: Findings from Sentiment Analysis

Rae Yule Kim, Montclair State University, Monclair, NJ

Positive online reviews are crucial for sales, but not all online reviews matter. We examined what makes online reviews influential (helpful) by text mining smartphone reviews on Amazon.com. We derived some important managerial recommendations based on the findings. Although text mining methods are still maturing, recent advancements in lexicon and improved classification accuracy have made text mining a relatively approachable method to examine customer review data. National Research Council, Canada launched an open-source lexicon that classifies words into not only binary sentiments but also into eight basic emotions, such as anger, trust, and joy. This opens new opportunities to explore text data to derive insights on contextual factors that influence online review helpfulness. We examined the effect of each emotional valence on online review helpfulness. We utilize smartphone online review data on Amazon.com. The dataset contains in total of 413,841 online reviews on various smartphone products from multiple brands, which were sold on Amazon.com as of January 1st, 2017. There are several benefits to narrowing down the scope to online reviews for the same product segment and to using smartphone reviews for this study. Smartphones are a ubiquitous and search product, and subsequently, consumers are likely to have comparable knowledge about the product and seek similar information to assess.Online review length improves online review helpfulness, however, sentiment polarity moderates the effect. Consumers were more likely to find long, elaborate reviews about 'unsentimental' product information helpful. Interestingly, sentiment polarity was effective to increase online review helpfulness, only when the sentiment was negative. Positive sentiment polarity was not a significant predictor for online review helpfulness,

indicating that consumers might be wary of extremely positive reviews due to increasingly deceitful review practices. Among positive emotional valences, trust was the only valence that significantly improved the online review helpfulness.

2 - Profits and Positivity with Body Neutrality: Analyzing the Impact of Fashion Brands' Use of Non-skinny Models on Consumer Choice

Chen (Chelsea) Cao, Hong Kong University of Science and Technology, Kowloon, Hong Kong
Zijun (June) Shi, Shunyuan Zhang

Recently, body neutrality, a social movement that embraces equality and acceptance for all bodies, has been increasingly gaining traction among public. Fashion brands including Nike and Lululemon have started to use plus-size models in their marketing and promotion, opposite to the field's long history of preferring skinny/underweight models. Yet, the impact of practicing size-inclusive on consumer choice and on brand's economics remains an empirically open question. This research aims to fill the gap by analyzing a unique longitudinal dataset consisting of customers searches and purchases on a leading e-commerce platform in Asia. From the displayed images of over 100,000 fashion products, we employ a self-correlation human parsing deep learning model to predict the model's body size (operationalized as the Body Mass Index—BMI). We also control for a rich set of clothes attributes and characteristics of the model that we extract from the display images. Exploiting the variation in the BMIs of models, we examine how using a plus-size and normal-size model, compared to using a skinny model, impacts sales of the focal product and of the parent brand. We further examine the consequences in customers' search and future purchases, after a customer was exposed to or purchased a product using a plus-size (normal-size) model. The after-sales analyses reveal interesting patterns with regard to consumer purchasing and searching across product sizes, brands, and categories. We discuss the managerial and policy implications of our findings.

3 - Improving Web Brokerage Model - Building Online Communities for Daily Deal Websites

Yiyuan Ava Liu, Otterbein University, Westerville, OH
Wanxi Li

Coupon-promotion based online brokerage model is applied by daily deal websites. Groupon.com, slickdeals.net, dealmoon.com and hundreds of deals sharing websites have gained great popularity since Andrew Mason introduced the deal-of-the-day concept in 2008. Deal information includes brands, retailers, base prices, deal savings and deal descriptions such as product and service features, exclusive coupons, and deal ending time. Attracting bargain-

hunting customers via price discounts and time-sensitive availability, some deal websites have gained tremendous and stable traffic and shared revenue, while other websites that fail to attract repeated visits disappear gradually in this oversaturated online space. In the current study, we are presenting three sets of empirical studies, in order to, 1) explain the impact of deal sharing website types and designs on brokerage model and referral marketing performances, 2) analyze deal sharing websites and community management in two language text contexts and conclude factors that help engage visitors and shape the positive sentiment through social media or deal sharing communities. We also find significant drivers of user engagement by creating deal sharing community and social media integration, as well as user-generated content (UGC).

4 - Success and Survival in Livestream Shopping

Weiqing Zhang, New York University, New York, NY
Zekun Liu, Xiao Liu, Eitan Muller, Feiyu Xiong
The livestream shopping industry, in which consumers can purchase products directly from live video sessions, is expected to exceed $60 billion in China in 2021 and $25 billion in the US in 2023. Despite the popularity of livestream shopping, many sellers fail within just a few weeks. We investigate the lead indicators of the success and survival of livestream shopping sellers. We ask three questions: 1. Livestream viewers can make purchases directly within the session (the direct selling effect) or can use the session to gain information that may inform purchases later on (the advertising effect). Which of the two effects is more important for a seller's success? 2. Livestream shopping encompasses three industries: e-commerce, social networks, and entertainment. Which industry-specific key performance indicators (KPIs) predict success? 3. Some sellers use livestream shopping for new product introduction while others use it for mature product inventory liquidation. Which type of seller is more likely to survive? We use a unique dataset from Taobao Live to show that: 1. Sellers who rely more heavily on the direct selling effect (vs. the advertising effect) are less likely to succeed. 2. The e-commerce KPI positively predict success, while the entertainment KPI negatively predicts success. For the social network KPIs, reach positively predict success, but engagement rate negatively predict success, reinforcing the advertising effect of livestream shopping. 3. Mature product sellers are more likely to succeed than new product sellers.

SC08

Virtual Room 08
ISMS Doctoral Awards

Awards Sessions
Chair: Jiwoong Shin
Yale School of Mangement, New Haven, CT,
06511-8978,

1 - This Session is a Continuation from SB08

Jiwoong Shin, Yale School of Mangement, New Haven, CT
This session is a continuation of SB08 if time is needed for presentations and discussion.

SC09

Virtual Room 09
Advertising I
Contributed Sessions
Chair: Michelle Song
Stanford Graduate School of Business, Stanford, CA

1 - Advertising and Privacy in Differentiated Markets

Ruizhi Zhu, University of Toronto, Toronto, ON, Canada
Sridhar Moorthy, Xianwen Shi
Firms often advertise their products through third-party platforms such as Facebook and Google. Consumer privacy regulation affects what information a platform can collect from consumers and what information it can share with potential advertisers for targeting purposes. In turn, those constraints may affect advertising prices, product prices, and whether consumers are exposed to relevant ads or irrelevant ads. We develop a model to examine the equilibrium implications of privacy regulation on consumer welfare focusing purely on its utilitarian aspects. Specifically, we are interested in asking whether all consumers will have the same stance toward privacy regulations or whether some would prefer stricter privacy rules while others prefer looser privacy rules. Our analysis focuses on the two extremes privacy regulation can take: no privacy and full privacy. Under the former, the platform observes consumer preferences and allows firms to target ads based on those preferences; under the latter, ad targeting is not possible.
We show that if consumers are horizontally differentiated, then the welfare impact of privacy regulation depends on whether the platform is paid on a cost per click (CPC) basis or a cost per impression (CPM) basis. Under CPM, mass-market consumers prefer full privacy, niche consumers prefer no privacy, and the platform itself prefers no privacy. Under CPC, however, all parties—mass-market consumers, niche consumers and the platform—are indifferent between the two privacy modes. Given the choice, the platform would prefer to price ads on a CPC basis in both privacy modes. The

results can be extended to more general privacy modes and an non-monotone relationship between expected payoffs and privacy level is found for both consumers and the platform. If consumers are vertically differentiated and both high- and low-value consumers are served, then all ads will be clicked and the two payment schemes are identical. High-value consumers prefer full privacy, low-value consumers prefer no privacy, and the platform prefers no privacy.

2 - Optimal Advertising Policy to Maximize Conversion, Loyalty, and Revenue

Saman Modiri, Syracuse University, Syracuse, NY
Liangbin Yang, Amiya K Basu

To find the optimal advertising budget and strategy, companies need to define and reliably measure customer response. This is complicated because customer response can be multi-faceted, incorporating such different elements as conversion, purchase frequency, monetary value, and individual heterogeneity. Additionally, companies need to not only consider the short-term implications of their campaigns, but also the long-term ones.

In this research, following insight from the stochastic models of buyer behavior, we develop a framework to define key performance indicators such as conversion, loyalty, and revenue at both individual and population levels. We connect these parameters to the firms' advertising activities using a time-variant DID framework. Using this framework allows us to capture the short-term and long-term advertising effects while accounting for individual heterogeneity. Merging a consumer and retail panel with advertisement data, we analyze more than 1K instances of advertisement campaigns for 5 different brands over the span of 12 years. Our results have important implications for advertisers and equip them with a mechanism to better optimize their ad campaigns. Using counterfactual analysis and contrasting our model with benchmarks, we show that our model provides new insight into customer response. We discuss the heterogeneous effect of ad campaigns on different response metrics and show this heterogeneity to be robust and significant, thus highlighting the need to take into account multiple metrics when optimizing an ad campaign.

3 - Advertising and Consumer Selection

Zhibao Li, Tianjin University of Technology, Tianjin, China
Yunchuan Liu

Extant literature usually focus attention on how consumers select product among multiple firms. We investigate how a firm selects among consumers for subsequent encouragement programs. We find consumers may self-signal to the firm and the firm should adjust accordingly.

4 - Information Disclosure in Markets: An Empirical Analysis of a Search Advertising Market with Heterogeneous Advertisers

Michelle Song, Stanford Graduate School of Business, Stanford, CA

Bidding in search advertising is commonplace today. However, determining a bid can be challenging in light of the complexity of the auction process. By designing the mechanism and aggregating the information of many bidders, the advertiser platform can assist less sophisticated advertisers. We analyze data from a platform that initiated a bid recommendation system and find that some advertisers may simply adopt the platform's suggestion instead of constructing their own bids. We discover that these less sophisticated advertisers were lower-rated and uncertain about ad effectiveness before the platform began offering information through the recommended bids. We characterize an equilibrium model of bidding in the Generalized Second Price (GSP) auction and show that following the platform's bid suggestion is theoretically sub-optimal. We then identify sophisticated and less sophisticated advertisers' private values using observed bids and the disclosed information. Counterfactual results suggest that the ad platform can increase revenue and the total surplus when it shares more information. Furthermore, the hybrid of auto-bidding with manual bidding could be a more efficient mechanism as we substitute less sophisticated bidding behavior for algorithmic bidding. These results shed light on the importance of exploring interactions between sophisticated and less sophisticated players when designing a market.

SC10

Virtual Room 10
Marketing, Finance, and Industry
Contributed Sessions
Chair: Cheng He
University of Wisconsin, Madison, WI

1 - Impact of Unexpected Outcome in Election on Consumer Variety Seeking Behaviors

Hamzeh Rayej, Concordia University, Montreal, QC, Canada
SunAh Kim, Ohjin Kwon

Studies in psychology and neuroscience have documented that unexpected outcomes along with prediction error (e.g., unexpected political outcomes) can affect exploratory and risk-taking behavior. It also suggests that the unexpectedness of an event can amplify the mood. We empirically study whether and how an unexpected outcome could shift

consumer choice behavior using a political event as a context. Using the Nielsen Homescan panel dataset and employing a difference-in-difference quasi-experimental method, we examine the impact of Donald Trump's surprising win in the 2016 U.S. presidential election on households' brand variety-seeking and new brand adoptions. Consistent with prediction error literature, the unexpected outcomes of the election significantly influence household choice behavior, and political ideology moderates this relationship. Our empirical results show that Trump's unexpected win increased variety seeking and new brand adoptions by conservative households than liberals. We rule out alternative mechanisms that these findings are driven by price promotion and change in the category expenditure. We check the robustness of our results using various assumptions including falsification tests. We discuss the implications of this research for retailers and brand managers.

2 - Bike-sharing Patterns and Utilization Factors: Empirical Study Based in San Francisco

Sungha Jang, San Francisco State University, San Francisco, CA
Ian Sinapuelas

Bike-sharing is an environment-friendly, affordable, and accessible public transportation mode. Its popularity and contribution to public transportation traffic are growing in many cities. For example, bike-sharing in the San Francisco area accounts for 2% of total public transportation traffic. However, there is no systematic and integrated research on bike-sharing patterns, utilization factors, and optimal marketing strategies. We analyze bike-sharing data in San Francisco to understand the level of bike-sharing utilization in terms of the number of bike trips, bike trip duration, and estimated revenues. We examine the effects of various factors, including unique station characteristics, supply factors, the organization's marketing factors, geographic factors, and, most importantly, the number of public transportation mode stops within a distance. Our main findings are that bike-sharing is a substitute for other public transportation modes when bike stations are available within a close distance and a complement to them when bike stations are farther. Other important utilization factors include the number of bike docks, pilot stations, geographic peculiarities such as proximity to tourist sites, uneven topography, and areas with higher retail activities. This research contributes to expanding our understanding of a new growing public transportation mode by specifically demonstrating the effects of the various factors. Based on our findings, managers can develop optimal distribution strategies.

3 - Fair Lending in Vehicle Financing: The Impact of CFPB's Intervention on Dealer Markups and Race Discrimination

Cheng He, University of Wisconsin, Madison, Madison, WI
O. Cem Ozturk, Pradeep Chintagunta

The opaqueness of the dealer markup practice coupled with a regulatory vacuum has resulted in growing concerns about unfair lending, especially for vulnerable consumers that have less knowledge on the auto loan market or fewer credit options (e.g., minorities or women). The guidance established that the CFPB can hold indirect auto lenders accountable for illegal discriminatory markups by car dealers. Thus, it also encouraged lenders to revise their dealer monitoring and compensation practices to remove dealer discretion to markup buy rates and ensure the compensation mechanism does not result in discrimination. We collect a detailed and unique transaction-level data set between 2012 and 2015 covering three events associated with the CFPB's intervention: 1) the release of its bulletin in March 2013, 2) the Bureau's order to Ally to pay for consumer harm in December 2013. We exploit quasi-experimental techniques to examine the impacts of these events on dealer markup decisions. We find that, on average, dealers reduce the markups by 2.5 basis points (bps) in response to the CFPB's release of the guidance bulletin. Our results also indicate that the enforcement of the bulletin Bureau further amplified this effect, resulting in a decline of 15.2 bps following the enforcement relative to the pre-bulletin period. However, our analyses show that the intervention significantly increased the price premium gap between buyers from African American census tracts and non-African American census tracts. We provide empirical evidence to explain this counterproductive result.

SC12

Virtual Room 12
Multi-channels III
Contributed Sessions
Chair: Mingxi Yang
University of South Florida, Tampa, FL

1 - Does the Label Fit the Channel? The Effect of Shopping Online Versus In-store on Green and Ethical Purchases

Emelie Fröberg, Stockholm School of Economics, Stockholm, Sweden
Sara Rosengren

Our research investigates the impact of the shopping channel on purchases of sustainable products. Drawing on the concept of goal congruence, we suggest that the shopping

goals of consumers using different channels have varying degrees of congruence with the benefits offered by products with two different types of sustainability labels. Specifically, we argue that online shopping is more congruent with the benefits offered by utilitarian products with green labels, whereas in-store shopping fits better with the benefits of hedonic products with ethical labels. To overcome the gap between intention/attitude and behavior in the sustainability context, we rely on actual consumer purchases. We first conduct two studies, leveraging real-world grocery retailer datasets covering 400,000 purchases, which support the hypotheses based on our conceptual framework using (a) a quasi-experimental approach to study between-consumer effects and (b) analysis of a separate dataset to examine within-consumer effects. Moreover, in detailed exploratory analyses of within-consumer effects, we find that (a) the more utilitarian the shopping motivation and (b) the more utilitarian (or hedonic) benefits of the product category, the stronger effects. We also show that the choice of a product with or without a sustainability label depends on the shopping channel; goal congruence is key. Finally, we conduct a third study, leveraging a real-world beauty retailer dataset covering almost 480,000 purchases to test within-consumer effects based on hedonic shopping motivations. Again, the findings suggest that marketers who want to foster sustainable consumption will benefit from adapting their strategies to different shopping channels and sustainability labels.

2 - How Retailers Change Ordering Strategies when Suppliers Go Direct

Femke Gryseels, KU Leuven, Antwerpen, Belgium
Els Breugelmans, Kathleen Cleeren, Michiel Van Crombrugge

This study empirically investigates whether a supplier's decision to start selling directly to end-consumers provokes a reaction in terms of the ordering strategy of the downstream channel partners, i.e., the independent multi-brand retailers. We decompose (i) the aggregate metric of order value (in €) into changes in (ii) the number of distinct SKUs ordered, (iii) the quantity ordered per SKU, and (iv) the average wholesale price per unit. Next, we explore cross-retailer differences, investigating how responses vary depending on a retailer's power position and its exchange relationship with the supplier. We use data from a natural experiment, where a toy supplier historically operated through independent retailers only, but then decided to supplement these with its own direct-to-consumer webshop in the UK and France only. Using a difference-in-differences model on B2B order data, we first investigate the impact of the direct channel entry in the two focal countries and compare it to a control country where the direct channel was not introduced during the observation window (Spain). To explore the cross-retailer variation,

we additionally collected survey data on the retailers' relationship with the supplier before the channel introduction and investigate how the direct channel effect varies across retailers. Results show an overall decrease in the assortment and an increase in the wholesale price, suggesting that, on average, retailers are more likely to respond to the direct channel addition by exiting from the exchange. Furthermore, results on cross-retailer differences indicate that changes in retailer ordering strategy are moderated by both the retailer's power position and exchange relationship.

3 - How Well does your Movie Competes with Piracy? Modeling and Minimizing Piracy Loss

Mingxi Yang, University of South Florida, Tampa, FL
Brianna Paulich

Digital piracy is responsible for a loss of at least $29.2 billion each year, giving the public more chances to pirate. This study explores the negative financial impact of digital piracy on films, incorporating competing distribution channels (box office and video-on-demand rental sales). This study proposes a financial loss function in the context of digital piracy competing with multiple legal distribution channels, adding a new approach of modeling the potential financial loss due to piracy to existing literature. Furthermore, this is one of the first to address the issue of minimizing the piracy loss function in an empirical setting. The loss function model is applicable to movies with traditional ways of being released (i.e., theatrical release first), but also to movies that are released only online, and movies released in both theaters and online at the same time. We posit that movies that are released first in the theaters (theatrical release first) will have less loss to piracy than movies that are released simultaneously (simultaneous release) in theaters and online. Simultaneous-released movies will have less loss to piracy than movies that are released only online (online release only), especially in the first weeks upon release. This phenomenon of relatively less loss for theatrical-release-first and simultaneous-released movies diminishes as time progresses. The majority of the total piracy loss of movies occurs in the first three to four months after their first release. Moreover, movies that are deemed family-friendly, such as kids' fiction movies, are expected to have a higher piracy loss in the winter season than the other seasons. This research provides managerial implications for studios with various distribution strategies.

SC14

Virtual Room 14
Volumetric Choice Experiments (VCEs)
Special Sessions
Chair: Jordan Louviere

University of South Australia, Adelaide, Australia
Co-Chair: Richard Carson
PhD, University of California, San Diego, University of
California, San Diego, CA

1 - Application of Volumetric Choice Experiments in a Marketing Context

Towhidul Islam, PhD, University of Guelph, Canada, Guelph, ON, Canada
Richard Carson, Thomas Eagle, Jordan Louviere
Volumetric Choice Experiments (VCEs) are designed to capture purchase quantities and can be seen as an extension of Discrete Choice Experiments (DCEs) where individuals decide how many units of a specific good or service to buy/use rather than deciding whether to buy/use it or not. VCE's produce data in the form of integer counts rather than the binary or multinomial discrete choices. VCE presents new opportunities to study a range of behavior of interest to marketers and interesting challenges in implementing them. Like DCEs, VCEs have different components ranging from experimental design to modelling. Our focus here is on laying out the overall process of implementation rather than detailed analysis of specific components. Our empirical examples come from large-scale VCEs embedded in surveys administered to samples drawn from Information Resources, Inc. (IRI) consumer panel: canned tuna and single serve-coffee K-pods. The response takes the form of planned purchase counts, possibly zero. Our VCE designs allows for statistical identification of own- (brand by size) and cross-price elasticities, plus the effects of other attributes and demographics and their interactions with prices. Our planned purchase counts are fit using a negative binomial regression with a multilevel mixed-effects specification. We examine the external validity of our approach by comparing our estimates to those derived using actual canned tuna data purchases from the same IRI panelists. We concluded by suggesting general classes of behavior VCEs might be useful in predicting and discuss some unresolved research issues.

2 - Enhancing Customer Facing Business Recovery: Via the Choice of COVID-19 Transmission Reduction Measures

Richard Carson, Professor, University of California, San Diego, La Jolla, CA
Kevin Clark, Jordan Louviere, Sam Mayfield
We examine how the set of COVID-19 transmission reduction measures adopted influences the number of planned visits to 12 categories of businesses from three broad groups, personal services, restaurants and bars, and retail. The measures examined involve requiring face masks, vaccinating employees, requiring customers to be vaccinated, capacity limits, third-party health/safety certification, visible cleanliness measures, and reduced contact service. The study uses a volumetric choice approach implemented using four large survey waves of Washington State residents which allow examination of the influence of these measures change over time. The statistical model fit to the data is a random effects negative binomial count data model. In addition to the set of COVID-19 transmission reduction measures, including status quo none, deployed, and a randomly-assigned price level change, the predictor variables include the individual's self-report similar pre-COVID visits, and the respondent's vaccination status and a set of demographic variables. The uniformly strongest positive effect across all 12 business categories we consider ranging from big national retailers to hair salons was for requiring face masks of all. Comparison to a price level change provides a common metric by which to judge effect sizes. Older people, women, and the vaccinated are less likely to make planned trips relative to previous behavior suggesting greater risk aversion and the key target for restoring past-levels of economic activity. The temporal patterns suggest stable preferences, controlling for the upwardly trending vaccination status. Wave 4 (first half of December) predict a sharp drop in planned trips, subsequently observed and in contrast to the steady increases seen in previous waves.

3 - A Volumetric Choice Experiment Approach to Estimating the Elasticities of Demand for Cigarettes and Waterpipe Tobacco in Three Eastern Mediterranean Countries

Ali Chalak, American University of Beirut, Beirut, Lebanon
Ramzi G Salloum, Rima Nakkash, Niveen M Abu-Rmeileh, Yousef Khader, Mohammed Jawad, Aya Mostafa, Ruba Abla, Jordan Louviere
Stated preference (SP) methods can be useful in understanding consumers' demand for products that have adverse health impacts and yet for which there is little market and economics evidence. They can fill such knowledge gaps and contribute rich insights to the formulation of evidence-based fiscal policies aimed at harm reduction. Yet the standard discrete choice experiment (DCE) format can be restrictive in situations where more than one product and multiple units can be purchased. In this study, we employ instead a volumetric choice experiment (VCE) to accommodate these features in the demand for cigarettes and waterpipe tobacco products, and estimate own- and cross-price elasticities for them in Lebanon (n=1680), Jordan (n=1925) and Palestine (n=1679). We conducted nationally-representative household surveys to elicit respondents' stated purchases of eight cigarette and waterpipe tobacco product varieties by hypothetically varying prices. Data were

analyzed using zero-inflated Poisson models. We found the demand for premium cigarettes to be price elastic (range, -1.0 - -1.2) across all three countries, whereas the demand for discount cigarettes was less elastic than premium cigarettes in Lebanon (-0.6) and Jordan (-0.7) and more elastic in Palestine (-1.2). The demand for premium waterpipe tobacco was highly elastic in Lebanon (-1.9), moderately elastic in Jordan (-0.6), and inelastic in Palestine (0.2). The cross-price elasticity between cigarettes and waterpipe tobacco was near zero, suggesting the two products are not close substitutes. These VCE estimates serve as a strong evidence base for developing and implementing fiscal policies for tobacco control in the Eastern Mediterranean region.

Saturday, 12:45pm–1:45pm

POSTERS

Gathertown
Poster Session
Poster Session

1 - Ratioing and Credibility; The Effect of Like to Comment Ratio on Perceived Credibility of Tweets

Behzad Rezaee, University of Lausanne, Lausanne, Switzerland
Tobias Schlager, Markus A Christen

We are living at the apex of the communication era where people can easily share their news, experiences, and thoughts on social media which has created a lot of opportunities for us. However, wherever there is an opportunity, we will see opportunism as well. One of the current issues on social media is fake content and how to deal with them. In this article, we will show that cues such as the number of likes and comments of a tweet can play a significant role in its perceived credibility. More specifically and with analyzing both field and experimental data, we will demonstrate that the more like to comment ratio a post has, the more it is perceived as credible. We will also show that this perceived credibility comes from the channel of consensus cue which could be moderated by the susceptibility to the social influence of the user, their motivation, and their cognitive load. Moreover, as the boundary condition, we will show that only ratio matters for the perceived credibility and the order of magnitude of numbers don't play a role in our conceptual model.
Keywords: Ratioing, Credibility, Twitter

2 - A Conceptual Model of Sponsorship Signaling Processes

Hsin-Chen Lin, Associate Professor, University of New Brunswick, Fredericton, NB, Canada
Patrick Bruning

The sponsorship literature has applied signaling theory to explain how organizations communicate with consumers and other stakeholders with incomplete information about brands, products, and services. Yet, these applications do not adequately outline an organized typology of sponsorship signals or apply these concepts according to the broader processes outlined in signaling theory. This research specifies these processes, as well as the implications of different signals and signal characteristics. A typology and framework of sponsorship signaling processes is proposed to account for the types of signals sent, signal characteristics, signal reception, market responses, and signal feedback. The conceptual analysis revealed a sponsorship signaling process comprised of (1) a typology of presence, quality, and intention signals that convey diagnostic or symbolic information; (2) signal receptions that differ in valance and magnitude; (3) signal characteristics of observability, commitment, and credibility; (4) market responses; as well as (5) equity, emergent, and viability signaling feedback mechanisms. This paper provides a typology of sponsorship signals as part of a dynamic sponsorship signaling process. The paper also specified important aspects of the signaling process that remain underdeveloped, including sponsorship signal reception, the moderating role signal characteristics have in signal reception, and signaling feedback. The typology and framework should help organize future research on sponsorship signaling as guided by the proposed research agenda, and the model can be used by organizations according to the managerial guidelines offered herein.

3- The Influence of Product Presentation Format on Consumers' Product Perception in Online Environments

Soonho Kwon, Waseda University, Tokyo, Japan
Takanori Suda, Takuya Nomura

In this study, we clarify that a product presentation format in online retail affects both consumers' product perception(product size and weight)and flavor perception(richness). In online environments, a product image presentation format is of two types: front angle and front-side angle format. Front-side angle product images depict the most canonical view of a product and attract more visual attention than front angle product images. In addition, the elements that attract more visual attention (e.g., saturation) have a positive effect on the perceived size of products. Thus, the canonical product image presentation format (front-side

angle) is expected to be perceived as larger than the front angle format because it is more likely to attract consumers' attention. Further, the perceived size of a product influences weight estimation because of weight perception bias, in which larger objects are perceived as heavier. Therefore, the front-side angle presentation format that determines the perceived size of a product will also positively influence its perceived weight. Moreover, since weight perception affects taste evaluation, such as richness, the weight enhanced by the front-side angle product image is expected to enhance the perception of richness. We conducted an online survey of 186 participants, under two conditions (product presentation formats: front angle vs. front-side angle) single-factor randomized between-subjects design. Participants who viewed the product from the front-side angle perceived an increased product size than those who viewed it from the front angle. We then conducted a serial mediation analysis to confirm whether perceived product size mediates the perceived product size and weight to density. We examined confidence intervals (CIs) using 5,000 bootstraps to confirm the indirect effect. The results showed a significant serial indirect effect. The findings of our study show that the visual information of product size influences tactile information (weight perception), which in turn influences gustatory information (richness perception).

4 - Harmony Perception Backfire; The Effect of Product Display Based on Hue Color Combination

Hisashi Kawamata, Waseda University, Tokyo, Japan
The importance of color research in the area of consumer behavior has increased in recent years. Existing literature focuses on the effect of two-color combinations (analogous hue combinations—small hue differences between adjacent colors; and complementary hue combinations—which large hue differences between adjacent colors) on brand logo (Jeon et al., 2020), and the relationship between product and background (Huang et al., 2020). Few studies focus on the effects of three or more colors. In practice, many products, such as cushions, curtains, and shoes, are displayed in stores in a wide variety of colors. This paper investigates which product display based on color combination using 24 colors creates consumer satisfaction, as well as how the relationship between product display and choice satisfaction mediates harmony perception. Existing studies show that analogous hue combinations are preferred because of perceived visual harmony and consumers generally prefer harmony to disharmony (Bell et al., 1991). Thus, product displays that use analogous hue color combination lead consumer satisfaction. However, the small hue difference in analogous color combination displays of adjacent products

makes it difficult for consumers to distinguish the hue color difference between these products. Small differences among the alternatives provided less choice satisfaction (Dhar, 1997). When consumers choose products from analogous color combination product displays, consumer satisfaction is less than when they choose products from complementary color combinations. We conducted several studies based on the above hypothesis and confirmed that product display based on analogous hue color combination increased harmony perception. However, the consumer tended to be less satisfied with the analogous color combination in the product choice condition; the effect is magnified when the condition is set to select multiple products. This study contributes to color combination research and provides new insights into the importance of product display order.

5 - The Power of C2C Interactions: How Other Customers' Responses to Online Reviews Affect Subsequent Customers' Online Rating Behavior

Lu Wang, Tianjin University, Tianjin, China
Min Zhang, Li Yiwei, Sun Yuxuan
Online reviews have become an important information source for customers to make purchase decisions. However, as the number of reviews increases and fake reviews appear, consumers find it more difficult to sift through useful reviews and distinguish the authenticity of the information. In order to solve these problems and maximize customers' utility, more and more platforms have been developing their online review systems that make C2C interactions available through other customers' responses (OCRs). That is, other consumers can respond to existing online reviews after focal consumers post their own consumption experience. OCRs represent a unique touchpoint by which customers interact with each other to get more information, which may also affect subsequent customers due to the public visibility. Therefore, this paper explores whether and how OCRs will affect subsequent customers' rating behavior. This paper utilizes the review data of 1088 same restaurants on two major online platforms to conduct empirical studies. The fixed model and difference-in-differences (DID) identification strategy are used to estimate the effect of OCRs. The results show that the ratings of restaurants with OCRs significantly increase, and the consistency/inconsistency view of reviews and OCRs also significantly affect the subsequent customers' rating behavior. The obtained new insights provide a new perspective for the platform design of online review systems and enterprise management reviews.

6 - How Perceived Personalities of Earlier Contributors Influence the Content

Generation on Online Knowledge-sharing Platforms

Yu Feng, Peking University, Beijing, China
Cong Wang, Qiaowei Shen

With the prevalence of online knowledge-sharing platforms, in which user management and content creation are the central issues to platform governance. Interactions take place through users' linguistics, which is determined by the formation of the user's perceived personality in the eyes of others. To understand the impact of perceived personality on online discussions, a representation method that combines natural language processing method and unsupervised learning is developed to extract contributors' perceived personalities based on the contents they generated on the platform, which is further validated by a lab experiment. Using the algorithm, we obtain two set of personality perception, i.e., temporary and average personality perception, using the first reply and contributor's past comments respectively. Our results reveal that starter's perceived conscientiousness increases the final participation size, extend discussion time, and decreases later new content generation of the question; starter's perceived openness decreases the total discussion size and new content production, yet fasten the discussion pace. Starters high in conscientiousness or openness are perceived as more persuasive, thus impede other's motivation to contribute new knowledge. The choice of whether to participate in discussion is determined by perceived role of starters, as a starter high in conscientiousness is perceived as a dependent and reliable cooperator which attract others to join the discussion, while a starter high in openness is perceived as an intelligent leader or decision maker which discourage other's engagement. We also find a differential effect of temporary and average personality perception for different group type. When the question belongs to a group with KOL, starters' average personality perception will play a more important role than their temporary personality perception. The relative importance reverse in a group without KOL. Our method and empirical analysis can provide insights into the governance of online knowledge-sharing platforms.

7 - Don't Need All Eggs in One Basket: Reconstructing Composite Embeddings of Customers From Individual-domain Embeddings

Pan Li, New York University, New York, NY
Moshe Unger, Shahana Sen, Alexander Tuzhilin

Although building a 360-degree comprehensive view of a customer has been a long-standing goal in marketing, this challenge has not been successfully addressed in many marketing applications because fractured customer data stored across different silos are hard to integrate under one roof due to platform-related technical problems and breaching of privacy norms around customer information. To this end, we propose a Deep Learning-based method, theoretically grounded in Kolmogorov's Mapping Neural Network Existence Theorem, to integrate several product or domain-specific partial customer views into one consolidated or composite customer profile, where we need to securely access domain-specific or siloed customer data only once for building the initial customer embeddings. We conduct extensive studies on two industrial applications to demonstrate that our method effectively reconstructs stable composite customer embeddings that constitute strong approximations of the ground-truth composite embeddings obtained from integrating the siloed raw customer data. Moreover, we show that these privacy-preserving reconstructed composite embeddings significantly outperform partial embeddings while providing recommendations for new domains, and outperform state-of-the-art baselines in the consumer response prediction tasks.

8 - An Analysis of Activating Communication on Website Between Users by the Propensity Score Considering the Heterogeneity of the Questioner

Maika Sasaki, University of Tsukuba, Tokyo, Japan
Keisuke Ishibashi, Ozaki Koken

We analyzed how the reactions of other users to the behavior of one user affect the re-behavior of the same user on an online website, which belongs to C to C interaction. Specifically, using the data from the Question and Answer website for parents raising children, we analyzed what kind of answers to the questions to activate the website would make it easier for the same questioner to ask the next question in a short period of time. The answer to the question is regarded as a treatment, and the effect on the time until the next question is analyzed for each treatment - a quick answer, a good answer and a long sentence answer. By aligning the covariates such as the attributes of the questioner between the treatment group and the control group, we used the propensity score and excluded the effects of differences in covariates from the effects of the treatment. Although the propensity score has the problem that the unobserved covariates could not be balanced, but in this study, by incorporating different random intercepts for each questioner into the propensity score calculation model, we could balance the heterogeneity of unobserved questioners. As a result of the analysis, if the questioner is the first answer to the question and the answer is a good answer, the time until the next question by the same questioner is

shortened. The finding has important implications for firms operating online website that want to better examine how to activate the website.

9 - Product-line Design with Consumer Habit Formation

Dawei Jian, University of California-Riverside, Riverside, CA

Consumers' repeated purchasing behavior prompts them to form a habit. How should the firm design the product line? We study a new product line design problem, where the consumer's private valuation fluctuates endogenously over time as driven by consumer habit formation. By leaving the consumer a stake in the future, the optimal prices resemble the advance selling and price discount structure to prevent the well-known cannibalization problem. The firm should design the product line quality to internalize both contemporaneous externalities caused by cannibalization and intertemporal externalities due to habit formation. The optimal quality characterizes two effects of consumer habit. Despite the direct welfare effect that increases future surplus, habit formation exhibits indirect strategic effect: by changing future consumer heterogeneity, habit formation can either exacerbate or alleviate the cannibalization problem, depending on whether the formation process is strong or weak. We also provide practical implications to guide the practice. First, we identify reasons why firms should consider valuation endogeneity when selling the goods: it can leverage consumer uncertainty, exploit consumer habits, and homogenize consumer preferences. Understanding these economic forces can help avoid the pitfalls in product-line design. Second, we discuss when promotions fail to benefit the firm, and provide the firm to carefully promote: either low-end consumers have sufficient mass, or habit formation is sufficiently weak, excessive promotions can hurt the firm.

10- How Does Bundling Affect Consumer Evaluation of Co-branded Services?

Chia-Lin Lee, Taiwan Tech, Taipei, Taiwan

One important parameter for defining various types of co-branded services involves the level of integration, that is, how closely two brands are linked in form and function. Previous studies have shown that when two brands are combined, their values influence each other only at a higher integration level. However, extant research in this field totally neglects whether consumers deem the offerings of brands to be a bundle—the bundling effect. The purpose of this paper is to bridge this critical gap. This study uses a mathematical model to illustrate our theory-driven proposition. Then, survey data are used to test the proposition empirically. The results show that, in the low-integrated co-branded services, the bundling

effect makes the partnering brands a composite offering in which the perceived performance of one brand can affect that of the other. Consequently, the values of both brands can be mutually affected. To the best of the authors' knowledge, this research is the first to identify the bundling effect in co-branded services research.

11- The Heterogeneous Impact of Discount Coupons on Customer In-app Behaviors: Evidence from Field Experiment and Causal Forests

Miyeon Jung, University of Nevada, Las Vegas, NV
Seoungwoo Lee, Shiny Ahn, Daegon Cho

The majority of customers nowadays go through the purchase funnel entirely on mobile in many product categories, and a growing number of retailers deploy a mobile-first strategy that prioritizes serving them. This paper investigates the effectiveness of mobile coupons that may vary across the purchase funnel stages in which these mobile-only customers are located. The authors conducted a randomized field experiment with a major fashion retailer in Korea and found differential impacts of coupons across the funnel stages in a causal manner. They found that customers in the middle stage, who show a moderate level of interest in a product by putting it in a wishlist, respond positively to a coupon. A better coupon that offers a deeper discount makes customers in the early stages increase their purchase likelihood, but the better coupon has no impact in the late stage. Also, the authors measured the heterogeneous effects of the coupons within each funnel stage by utilizing the Causal Forest method with very detailed in-app behavior data. While certain degrees of heterogeneity exist in every stage of the funnel, the customers in the middle stage show the highest level of heterogeneity. Further, the authors identified customer behaviors associated with positive heterogeneous effects; specifically, they found that 1) adding and then removing a product from a wishlist and 2) searching a product on the app's home screen are the customer behaviors positively associated with higher purchase likelihoods. The results and their simulation analysis indicate that retailers can substantially improve coupon effectiveness by individually targeting customers in the middle stage of the purchase funnel based on their past in-app behaviors.

12- The Role of Intertemporal Budget Constraint in Competitive Market for Non-durable Seasonal Goods

Shiyu Yang, Tongji University, Shanghai, China
Ye Qiu

Recent studies suggest that it is common for consumers, especially Gen Z, to delay purchasing behavior due to revolving credit card debt. Thus, intertemporal budget constraint should be an important factor while modeling consumers purchasing behavior. This study developed a two-period model to investigate the outcome of the price competition between two firms sealing non-durable seasonal goods to strategic consumers. We captured two dimensions of competition: firms competing with its rival and firms competing with its future self. We find out that under certain conditions, competition will be reduced after introducing a rival into the Coase framework. This is because that firms' responses in the second period induced by price reduction of the focal firm in the first period make consumers prefer to buy its enemy's product at full price. This leads to a smaller demand increase in the first period of the focal firm compare to what happened in the monopoly case. We also established that the emergence of BNPL (buy now pay later) which relaxes consumers budget constraints can improve the social welfare by reduce the product price and sometimes increase market coverage. Moreover, both firms and consumers benefit from BNPL in equilibrium.

14- Understanding Impact of Ad Length on Campaign Performance with Amazon Audio Ads

Alyson Sprague, Amazon, San Francisco, CA
Luba Smolensky

We seek to understand the impact of ad length on Amazon audio ad campaign performance, and provide ad length recommendations based on a brand's campaign goals. We measured four KPIs to achieve this objective using both 1P Amazon retail metrics and 3P brand lift metrics. For instance, we reviewed ad length impact on ad recall, reported brand favorability, and reported consideration using third-party brand lift insights. Furthermore, we analyzed Amazon detail page view rate to evaluate brand consideration for brands that sell products on Amazon. We also controlled for campaign length and frequency to ensure performance was influenced mostly by ad length and not other campaign factors. This research identified three data-backed recommendations to help determine the right ad length for advertiser's Amazon Ads audio campaigns. First, we've found in our study that ad length did impact performance. We recommend brands use these insights to plan their Amazon Ads audio campaign, selecting the ad length most appropriate for their campaign goal. Second, we recommend brands aiming to improve upper-funnel metrics use shorter ad lengths (:10-:20seconds), as these ad lengths tended to work better in these metrics. Lastly, we recommend brands

aiming to improve mid-funnel metrics use longer audio ads (:21-:30seconds), as these ad lengths tended to work better in driving DPVR and reported consideration.

15- Influencing the Influencer with Consumer Bias

Luying Wang, Tianjin University, Tianjin, China
Yunchuan Liu

We study the effects of consumer bias on marketer engagement in word of mouth. Influencer posts product review to followers of different beliefs and allows sponsorship from marketer for product promotion. We set up a game theory model to formulate the interaction between firm and influencer. We also use Bayesian persuasion with multiple receivers to model the effect of influencer's product review on consumers' belief updating. Our results suggest that consumer heterogeneity plays an important role in marketer's engagement in influencing marketing on sponsorship volume and product sales. Improved marketing efficiency is achieved through the endogeny of consumer prior belief from homogeneity to heterogeneity. A marketer may strategically target consumer segments based on consumer bias on prior belief through announcing sponsorship disclosure extent in influencer's review. Interestingly, marketer partially sponsors influencer is optimal even if consumer's prior belief is at a high level and marketer partially sponsors influencer is optimal even though consumer's prior belief is at a low level. Sometimes even consumer's belief shows a positive bias on product, the marketer may still be hurt from a higher sponsorship to increase influencer's incentive to post review. Counter intuitively, we find sometimes consumer's positive bias may hurt the firm but benefit consumers even the actual product fit isn't high enough.

16- Understanding and Improving Fairness-accuracy Trade-offs in Multi-task Learning

Yuyan Wang, Google Research, Mountain View, CA
Xuezhi Wang, Alex Beutel, Flavien Prost, Jilin Chen, Ed H. Chi

As multi-task models gain popularity in a wider range of machine learning applications, it is becoming increasingly important for practitioners to understand the fairness implications associated with those models. Most existing fairness literature focuses on learning a single task more fairly, while how ML fairness interacts with multiple tasks in the joint learning setting is largely under-explored. In this paper, we are concerned with how group fairness (e.g., equal opportunity, equalized odds) as an ML fairness concept plays out in the multi-task scenario. In multi-task learning, several tasks are learned jointly to exploit task correlations for a more efficient inductive transfer. This presents a multi-dimensional Pareto frontier on (1) the trade-off between group fairness and accuracy with respect to each task, as well

as (2) the trade-offs across multiple tasks. We aim to provide a deeper understanding on how group fairness interacts with accuracy in multi-task learning, and we show that traditional approaches that mainly focus on optimizing the Pareto frontier of multi-task accuracy might not perform well on fairness goals. We propose a new set of metrics to better capture the multi-dimensional Pareto frontier of fairness-accuracy trade-offs uniquely presented in a multi-task learning setting. We further propose a Multi-Task-Aware Fairness (MTA-F) approach to improve fairness in multi-task learning. Experiments on several real-world datasets demonstrate the effectiveness of our proposed approach.

17- Sponsored Advertising Bid Management Tools in Online Marketplace

Wenxiao Yang, University of Illinois, Champaign, IL
Yunchuan Liu

In this paper, we investigate the strategic role of bid management tools provided by platforms in online marketplaces. Bid management tools (for example, broad match, automatic and flexible bidding) are provided by platforms to help advertisers bid for sponsored advertising slots. Previous research has focused on the role of these tools in reducing advertisers' management costs and varying advertisers' bids; tools with lower accuracy than advertisers' self-management accuracy are typically provided to increase profits in search engines. However, the effects of these tools change in online marketplaces. We develop a game-theoretical model of a platform and two competing sellers. Despite the roles studied previously, bid management tools can also help match sellers with their target consumers, benefiting both sellers and the platform. In contrast to previous research, tools with higher accuracy than advertisers' self-management accuracy can be provided in some situations. Since the platform generates revenue through sponsored advertising's auction payments and sales commissions on products sold by sellers, higher tool accuracy can increase profit by higher commission but lower auction payment. Surprisingly, we find that a higher commission rate doesn't always correspond to higher optimal tool accuracy. In some cases, the platform with a lower commission rate would set higher tool accuracy because of the effect of attracting sellers into auctions.

18- The In-Store Experience Induces Price Primacy Amongst Online Shoppers

Nicolette Sullivan, The London School of Economics and Political Science, London, United Kingdom
Ling-Ling Zhou, Gavan Fitzsimons

Physical stores often offer a website or app as an alternative, and we know little about how information search differs - especially if these experiences occur in sequence or simultaneously. However, changes to information search, such as the order of information acquisition or time dwelt on specific attributes, have a large influence on choice. Here, participants shopped for haptic products such as carpets, and experienced an online or in-store experience first, or both simultaneously. The online experience allowed participants to view product information by hovering over attribute (e.g., price) with a mouse cursor. The in-store experience allowed participants to touch and hold the products and view the price. Participants then ranked the products and were told, without deception, that one participant would receive their highest-ranked option installed in their home. We found that participants viewed price first and for longer when the in-store experience came first, and induced more transitions from price to brand information, and fewer transitions between haptic or quality information such as ratings and material, compared to performing the online experience first. By contrast, when able to view online information while holding the products, participants viewed price less. A condition in which only online information was available induced more gaze to quality information such as reviews. Together, this indicates that the order in which each shopping context is experienced alters the order of information acquisition.

19- Have I Seen You Before? Measuring The Value of Tracking for Digital Advertising

Grazia Cecere, Institut Mines-Telecom Business School, Evry, France
Sarah Lemaire

We investigate the effect of privacy protection rules on targeting efficiency and ad prices. We use a change in Apple's privacy policy the App Tracking Transparency option, as a natural experiment. Introduced in Spring 2021, this new feature of the iOS 14 aims at providing smartphone users with more control over their data. It requires app developers to request explicit permission to track users beyond the app in use. However, this privacy policy is expected to reduce ad effectiveness on mobile devices. To assess the effect of the policy, we use an original database of estimated Facebook ad performances in the US market. We compare the outcomes of ad campaigns targeting iOS users versus Android users. The results suggest a reduction in targeting efficiency and ad prices for ads aimed at iOS users compared to Android users.

20- Reducing Discrimination with Information: Evidence from Online Labor Platforms

Ozge Demirci, University of Warwick, London, United Kingdom

Freelancing platforms have gained enormous popularity, connecting millions of employers and freelancers worldwide. These online labor markets enable workers worldwide to supply their labor globally by reducing transaction and search costs. Although online platforms reduce certain costs by making global labor markets more accessible, some information asymmetries also persist in these markets. Particularly when employers are from high-income countries, such informational frictions may disadvantage freelancers from developing countries relative to those from high-income countries. As a result, freelancers in developing countries who compete in global online markets tend to face information asymmetries that lead them to accept less than optimal wages. In this paper, I study the wage gap between developing and developed countries' freelancers in digital labor platforms and explain the mechanisms driving this gap. I have focused on one of the largest global freelancing platforms and created a unique panel dataset including over 100,000 freelancers and their labor market activities over a year. I find that freelancers from developing countries earn 34 percent less than those from developed countries after controlling for individual characteristics and cross-country pricing levels. However, the penalty on wages linked to the country of origin decreases as contractors provide more standardized information about their skills. For instance, higher levels of experience, higher reputation scores, providing information on educational background, or standardized test scores benefit freelancers' from developing countries disproportionally more. This paper contributes to the growing literature of discrimination in online platforms by showing that having higher reputation scores or detailed profile descriptions can benefit freelancers from developing countries more and help to modify inaccurate beliefs about their quality.

21- Biased Recommendation with Superior Knowledge under Discrimination Compliance

Zibin Xu, City University of Hong Kong, Hong Kong
Michelle Lu

With superior consumer information, an intermediary platform such as Netflix or Amazon can customize recommendation to facilitate consumer preference learning and product matching. However, these platforms may have biased incentives to steer consumers into accepting recommendations with higher payoffs. This incentive leads to consumer suspicions of the platform's potential abuse of superior information. In this proposal, we develop a game theoretical model to examine the strategic interactions between an intermediary seller with biased incentives and consumers with noisy prior of intrinsic match values. Our research questions focus on the profit and welfare implications under different compliance policies, which

regard discrimination based on the consumers' personal information, behavioural data, or intrinsic preference types. Our preliminary results suggest that it may be more profitable for the platform to refrain from using personal data in behavioural targeted recommendations, even though the additional information may improve the accuracy of identifying consumers' intrinsic match values. In addition, the current data policy that requires the platform to reveal its collected behavioural data to consumers may harm the consumers by reducing the overall relevancy of equilibrium product recommendations.

22- Sharing Bike-sharing and Car-sharing? An Empirical Analysis

Yiqi Li, Ross School of Business, University of Michigan Ann Arbor, Ann Arbor, MI
Puneet Manchanda, Emanuel Schuster, Martin Spann

Bike-sharing and car-sharing are important components of the Sharing Economy. However, it is not clear whether these two are complements or substitutes. Using data from a company that offers both modes (though under different brands), we propose a Nested-Logit structural approach to analyze how nearby cars (bikes) affect bike (car) sharing demand at the station-level. Besides, we also examine the behavior of individuals who use both car-sharing and bike-sharing. The results show that more cars (bikes) reduce the bike (car) sharing demand nearby, especially for car-sharing. Overall, our results suggest that bike-sharing and car-sharing are substitutes to each other respect to the number of bookings.

23- Informational Components of the Social Spread of Digital Content

Bruce Dore, McGill University, Montreal, QC, Canada

Marketing research has identified correlates of the spread of digital content but has not yet identified patterns of text meaning that predict this spread with high accuracy. We used machine learning to develop a language-based signature of information sharing, trained on over 3 million messages from social media. Specifically, we apply a technique known as word embeddings to represent the meaning of social media posts. Next, we use these embedding vectors as input variables to a partial least squares model trained to predict sharing counts. This resulted in a linguistic signature of social sharing: a pattern of regression weights across semantic vectors. This signature predicted sharing with substantially higher accuracy than models drawn from prior theory, generalizing across content categories, publishers, and time. Signature expression was not highly predictive of excess message liking or commenting, suggesting that it is not an index of positive evaluation or general engagement, but specific to social transmission. The components of

this signature spanned multiple psychological categories, including negative affect, temporal focus, social perspective, and perceptual processes, with no single category necessary or sufficient for the signature's overall predictive efficacy. Finally, we show that contextualized, publisher-specific versions of the signature reach even higher accuracy than the generalizable 'one-size-fits-all' version, indicating that the content drivers of information sharing vary substantially by context. Overall, this work derives an interpretable text-analytic model of the sharing potential of information, providing a basis for new taxonomies of the content dimensions and social processes that drive the spread of information at scale.

24- Sponsored Search Auction and the Revenue-maximizing Number of Ads Per Page

Pallavi Pal, Stevens Institute of Technology, Hoboken, NJ

In this paper, I derive a new method to identify the distribution of the advertiser's ad-value in the sponsored search auction, explicitly looking at weighted Generalized Second Price auction. Compared to previous literature, this method incorporates a weaker and more realistic assumption of incomplete information. Additionally, I evaluate how much the advertisers shade their bid below their value, defined as bid shading amount. The results show that the bid shading is minimal; the 50th percentile of the bid shading upper bound is below 0.2% of their value. The low amount of bid shading is due to a high level of competition in the online ad market. Additionally, I apply the derived distribution to look at the effect of externality on the search engine's revenue from ads. Firms use advertising as a medium to gain a competitive advantage, which is negatively affected if the ad appears alongside their rival's ad -- a form of externality. I estimate a structural model based on a novel data set of Yahoo! ads to quantify the effect of externality on an advertiser's value and then simulate the revenue-maximizing number of ads. I find that externality depends on the quality and quantity of competing ads. For example, in the laptop category, an advertiser's willingness to pay decreases by thirty-two percent due to the addition of a second high-quality ad, but only by eleven percent due to a low-quality ad. Furthermore, the counterfactual results suggest that the revenue-maximizing number of ads per page differs across the ad product category, with five ads per page on average. Implementing the recommended number of ads would lead to, on average, a 4.5 percent increase in revenue. These results provide evidence supporting the recent changes in the online advertising market; for example, Microsoft introduced a service called RAIS that provides advertisers with an option of an exclusive ad display.

25- Understanding Influencer Advertising - A Machine Learning Approach

Hyunsang Son, The University of New Mexico, Albuquerque, NM

As consumers increasingly relying on peer-to-peer communications, influencer marketing, which uses the influencers- individuals who post to their social media accounts in exchange for compensation (Agrawal, 2016) is also frequently used. For example, 93% of marketers use influencer advertising (Fertik, 2020), and it is expected that the marketing budget for influencer advertising is expected to reach $15 billion by 2022 (Insider Intelligence, 2021). However, despite the exponential usage of these social media influencers, the effects of influencer advertising are still questionable by showing a median engagement rate per post is .08% on Facebook, .98% on Instagram, and .045% on Twitter (Feehan, 2021). Thus, this research aims to understand how different features influence the effectiveness of influencer advertising on Instagram to generate more engagement using cutting-edge machine learning techniques.

SD01

Virtual Room 01
Search: Theory and Evidence II
Contributed Sessions
Chair: Akhil Ilango
Universitat Pompeu Fabra, Barcelona, Spain

1 - A Micro-founded Model of Repeat Buying Based on Information Tracking

Wee Chaimanowong, The Chinese University of Hong Kong, Hong Kong
Tony Ke

A consumer incurs a constant flow cost to keep track of information on a firm's new product, which updates her expected valuation according to a Brownian motion. The consumer's purchase need follows a Poisson arrival over time, and upon an arrival, she decides whether to make a purchase or not. Moreover, at any time, she decides whether to keep tracking information or to drop out so as to maximize expected utility. We characterize the consumer's optimal purchase and dropout decisions in closed form. We find that consumers who are about to drop out tend to purchase less frequently. Our model generates endogenous consumer loyalty due to survival bias---consumers who are alive are more likely to stay alive and continue to make purchases in the future. This is captured by a one-parameter formula for the individual-level retention rate that features an initial steep drop and an asymptotic slow decay at the rate of inverse

square root of time. Moreover, we prove sub-exponential distribution of purchase instances and provide closed-form formula for the firm's expected revenue. We estimate the model numerically by two methods: random walk simulation and numerically solving a heat equation. A comprehensive study shows that after incorporating consumer heterogeneity in the need arrival rate, our model provides a similar level of fit and prediction accuracy compared with popular existing models such as Pareto/NBD and BG/NBD. For the study, consumers' information tracking cost is estimated to be about $4.5 per annum.

2 - Sponsored Search
Akhil Ilango, Universitat Pompeu Fabra, Barcelona, Spain
How does online advertising affect consumer behaviour, product pricing and competition? To analyse this, I develop a theory of digital markets where an intermediary provides a platform for firms to advertise their product and where consumers need to engage in costly search if they want to learn about the product characteristics. The contributions of this paper are twofold. First, I show that when prices are observable prior to the costly product inspection, a more prominent (higher in the search order) firm charges a higher price and earns a higher revenue. Second, I augment this model by allowing the intermediary to determine endogenously the order in which products are displayed and the advertising commissions (per-click) to be paid, through an auction. I show that the pass-through from these commissions to product prices is higher for a less prominent firm, thus restricting its ability to compete using price. This asymmetry in equilibrium lowers competition, consumer surplus and total transactions in the product market. This result informs the ongoing policy discussion on the effect of dominant digital platforms on product market concentration.

SD04

Virtual Room 04
Understanding Team Work Performance
Special Sessions
Chair: Yan Xu
Virginia Tech, Blacksburg, VA
Co-Chair: Andrew Ching
Johns Hopkins University, Baltimore, MD

1 - Collaborate to Compete: An Empirical Matching Game under Incomplete Information in Rank-order Tournaments
Chunhua Wu, University of British Columbia, Vancouver, BC, Canada

Yijun Chen, Tat Y Chan
This paper studies the collaboration of talents in rank-order tournaments. We use a structural matching model with unobserved transfers among participants to capture the differentiated incentives of participants behind collaborations, with specific focus on incorporating incomplete information and competition in the matching game. We estimate our model using data from a leading data science competition platform and recover the heterogeneous preferences of participants that determine whether and with whom they form teams. Using model parameters, we conduct policy experiments to investigate how the collaboration efficiency is affected by the incomplete information and competitive pressure on the platform. Our results provide implications on how firms could better align individual incentives to foster and improve collaborations.

2 - Estimating Worker Complementarity in Teams: Evidence from Real Estate Sales Teams
Yan Xu, Virginia Tech, Blacksburg, VA
Andrew Ching, Junhong Chu
Mantian Hu
This paper studies complementarity between heterogeneous sales agents when they work in teams. Using the sales records of a leading real estate company in China, we find evidence on heterogeneous levels of complementarity between different types of agents. We implement a finite mixture approach and specify a non-linear model of teamwork. Our model identification relies on being able to observe one agent works in different teams. We estimate agent complementarity and team production without imposing additional functional form restrictions. With our model estimates, we seek to evaluate different team formation algorithms' impacts on the overall team performances.

3 - Peer Effects from Friends and Strangers: Evidence from Random Matchmaking in an Online Game
Daniel Goetz, University of Toronto, Toronto, ON, Canada
Wei Lu
In this paper, we quantify the relative strength of social interaction (peer) effects from friends versus peer effects from strangers on consumers' product adoption decisions. We use a rich panel of data on in-app purchases and match play histories from an online game, where we leverage the game's quasi-random assignment of teammates and opponents to identify the causal effect of observed adoptions on purchasing. We find that adoptions by friends and strangers on the same team as the focal player have positive effects on focal consumers' adoptions; that the marginal peer effect from friends is nearly twice as large as the effect from

strangers; and that the cumulative peer effect from strangers is almost as large as the effect from friends given the higher volume of interactions with strangers. The evidence supports that peer effects operate by increasing awareness of the product. We discuss the managerial implications for optimal product seeding and team formation in this context.

4 - Goodbye My Friends and Goodbye My Career: Evidence from the Movie Industry

Xinlong Li, Nanyang Technological University, Singapore, Singapore
Andrew Ching

When managers need to put together a team, does referral/information spillover via candidates' network matter? This is a challenging empirical question because one's network is endogenous and a function of his/her ability. By analyzing over 180,000 professional teams in the movie industry (actors, directors, and producers) spanning 20 years, we provide evidence that network connections play a potentially important role in affecting actor's likelihood to be hired. Our identification strategy relies on the exogeneous death happened to some producers and directors, and its impact on the actors/actresses who are connected with them. Following the death of a producer/director, we find that, on average, actors/actresses who have worked with him/her before have a 6.95% decline in their future acting opportunities. The results are robust for quality-adjusted movies. By examining the interactions of the treatment effect with actor, producer and director characteristics, we consider several plausible mechanisms that might explain this finding. Our results indicate that referral/information spillover is the most likely driving force. We also find that more experienced actors/actresses are less affected by the loss of connections, and actresses suffer more from these death shocks than their male counterparts.

SD05

Virtual Room 05
Platforms III
Contributed Sessions
Chair: Xiaofeng Liu
UC San Diego, La Jolla, CA

1 - Name Stereotyping in the Gig Economy

Dalal Ahmad, Kuwait University, Shedadiah, Kuwait
The emergence of the Internet as a tool in the hiring process for gig workers has shifted the job market paradigm. Many observers have welcomed the advent of online labor platforms as a way for workers to gain fairer access to job opportunities, and achieve wage equality. Workers, they assumed, would be free to compete for gigs around the world based solely on their qualifications rather than their locations, race, gender, and other non-productivity-based characteristics. In this research, we look at the effect of workers' stereotypical names on pay disparity using data collected from an online hiring platform. We use propensity score matching to provide covariate balance for workers having stereotypical and non-stereotypical names. We also discuss the managerial implications, and provide insights for pay discrepancy in the gig economy.

2 - Monitoring Disintermediation in Peer-to-peer Markets

Yingkang Xie, Northwestern University, Evanston, IL
Jingyi Wang, Huaiyu Zhu

Disintermediation is a challenge for two-sided markets: trading partners who find each other on a platform can coordinate offline to cut out the middleman, resulting in missing data and revenue leakage for the platform. Both practitioners and researchers need good detection methods to uncover the extent of disintermediation and its causes. We demonstrate how to use text, geolocation, and fee experiments to identify disintermediation using novel data from an on-demand logistics platform. Cheaters may face a higher cost of covering up their tracks than hiding their intentions with words. Tracing drivers' GPS footprints near the shipping addresses of canceled trips can recover almost 95% of disintermediated transactions. In contrast, the standard industry practice of scanning conversations between trading partners recalls only half of the cases. While text data provides rich information about cheaters' motivations, firms that rely only on text mining could significantly underestimate their revenue leakage and thus fail to make informed decisions on pricing and product design. We further validate the GPS measurement using the behavioral changes triggered by an experimental variation in commission fees. Our work provides strategies for platforms to check whether they become showrooms for search and matching when minimum advertised pricing (MAP) monitoring and enforcement is not possible in peer-to-peer markets.

3 - Token Incentives and Platform Competition: A Tale of Two Swaps

Xiaofeng Liu, University of California-San Diego, La Jolla, CA
Wei Chen, Kevin Zhu

For each two-sided platform, how to grow in the competition with other platforms is an essential question. In this paper, we study impacts of token incentives, an alternative incentive approach, in the competition of two decentralized exchange

platforms. Decentralized exchanges rely on liquidity providers to supply liquidity that facilitates the exchange transactions from the demand side, which makes the amount of liquidity supply the key to platform success. The entrant platform, Sushiswap, launched token incentives to attract liquidity providers from the incumbent, Uniswap, who then also retaliated with its own token incentives. Our empirical analysis shows that Uniswap's own token incentives attract more liquidity to the platform. Surprisingly, we find that the token incentives from the competitor, Sushiswap, also bring more liquidity to the incumbent. Furthermore, large pools benefit more from this positive spillover. Meanwhile, the incumbent's token incentives do not seem to have a significant impact on the entrant. For the potential mechanisms, we find that increased liquidity is mainly from the increased number of new liquidity providers, which may be driven by information diffusion and increased awareness from the competitor's incentives programs. Our results provide important insights and practical guidelines on the design of token incentives in platform competition.

SD06

Virtual Room 06
Machine Learning and Personalization II
Contributed Sessions
Chair: Yuting Zhu
Massachusetts Institute of Technology,
Cambridge, MA

1 - A Sample Size Calculation for Training and Certifying Targeting Policies
Spyros Zoumpoulis, INSEAD, Fontainebleau, France
Duncan I Simester, Artem Timoshenko
There is a long history of firms using experiments to measure ATEs and choose uniform policies. When designing these experiments, firms often use a power calculation to select the sample size. Now that firms are shifting attention to targeting policies, a new question arises: what is a sufficient sample size for training a targeting policy and certifying it compared to a benchmark policy? We propose efficient algorithms for calculating the minimum sample size required to train and certify a targeting policy. We consider two approaches that firms may want to use to compare a targeting policy with a benchmark policy. The first approach calculates the training sample size required so that the expected profit improvement of the targeting policy over the benchmark policy exceeds a specified fixed threshold. The second approach calculates the training and certification sample sizes required so that the expected profit improvement of the targeting policy over

the benchmark policy exceeds a threshold determined by a statistical significance test, with desired power and confidence levels. For both approaches, we characterize the optimization problem that yields the minimum sample sizes, and provide efficient and practically implementable algorithms for solving it. The proposed procedures are easily applied once the relevant data is obtained, and the sample size calculations are easily scaled to any number of segments or any benchmark policy. We illustrate how to implement the proposed procedures using data from an actual field experiment, and we validate the procedures by comparing the sample sizes they recommend with the actual sample sizes required when implementing a range of different estimators. The findings indicate that the proposed algorithms provide reasonable estimates of the amount of data required to train and certify a targeting policy. They also reveal that the amount of data required to train and certify a targeting policy may be a lot less than the amount of data required to choose and certify the optimal uniform policy.

2 - Don't Need All Eggs in One Basket: Reconstructing Composite Embeddings of Customers from Individual-domain Embeddings
Pan Li, NYU, New York, NY
Moshe Unger, Sahana Sen, Alexander Tuzhilin
Although building a 360-degree comprehensive view of a customer has been a long-standing goal in marketing, this challenge has not been successfully addressed in many marketing applications because fractured customer data stored across different silos are hard to integrate under one roof due to platform-related technical problems and breaching of privacy norms around customer information. To this end, we propose a Deep Learning-based method, theoretically grounded in Kolmogorov's Mapping Neural Network Existence Theorem, to integrate several product or domain-specific partial customer views into one consolidated or composite customer profile, where we need to securely access domain-specific or siloed customer data only once for building the initial customer embeddings. We conduct extensive studies on two industrial applications to demonstrate that our method effectively reconstructs stable composite customer embeddings that constitute strong approximations of the ground-truth composite embeddings obtained from integrating the siloed raw customer data. Moreover, we show that these privacy-preserving reconstructed composite embeddings significantly outperform partial embeddings while providing recommendations for new domains, and outperform state-of-the-art baselines in the consumer response prediction tasks.

3 - Training Personalization Policies for Large Audiences with Constraints

Yuting Zhu, Massachusetts Institute of Technology, Cambridge, MA

Haihao Lu, Duncan I Simester

Personalization, which aims to target different marketing actions to different customers, has attracted broad attention in both academia and industry. While most research has focused on training personalization policies without constraints, many firms face constraints when training these policies. These constraints can introduce difficult optimization challenges, particularly when the firm intends to implement the policies with large samples of customers. Traditional optimization methods are often unable to overcome these challenges. We show how recent advances in solving large-scale linear programming problems can be applied, and provide theoretical guarantees on both optimality and computation speed. Using a large-scale field experiment, we empirically show the advantages of our methods for different customer sizes, and different types of business constraints.

SD07

Virtual Room 07
Digital Marketing Applications
Contributed Sessions
Chair: Ugurcan Dündar
WU Vienna, Vienna, Austria

1 - Dynamics of Online Creators' Engagement States and Content Contribution: Evidence from Online Literature Markets

Shibo Li, John R. Gibbs Professor of Marketing, Indiana University Bloomington, Bloomington, IN

Amy Wenxuan Ding

Individuals are increasingly becoming creators of user-generated content. However, little is known about such creators' unobserved engagement states and their dynamic contribution behavior. This paper presents a dynamic structural model with a hidden Markov process to uncover the mechanisms of creators' content contribution decisions (whether and what to contribute) and their dynamics and consequences. Using online literary markets as the context, we show that a creator often exhibits multiple engagement states over the course of producing one serial product. We find that the impact of various intrinsic and extrinsic incentives on content contribution depends on the content creator's engagement states. A creator is likely to start in the high engagement state but is more likely to stay longer in the medium state. Over time, a creator's probability of

remaining in the medium state increases. The cost of content contribution is the highest in the low engagement state and the lowest in the medium state. Significant creator and product heterogeneity exist in the creator's engagement states and optimal contribution decisions. Our study provides important theoretical and actionable managerial implications for marketing researchers, site managers and average individuals as content creators.

2 - Grow Your Brands on Amazon: An Ml Approach to Prioritizing Your Marketing KPIs

Alexander J Bruening, Applied Scientist, Amazon, New York City, NY

Xiaogan Mao, Shao-Wen Yang, Oded Netzer, Koen Pauwels

Faced with a growing arsenal of media mix tactics, brands are overwhelmed by what can be done, while left wondering where to start to grow their businesses. Brands want to know which KPIs they should focus on to grow their brands to the next level. We propose a method to prioritizing marketing key performance indicators (KPIs). Our proposed method is tailor KPI prioritization toward each and every brand, and is scalable in space and time. We utilize this method to deliver recommendations to help brands on Amazon prioritize KPIs. Without loss of generality, we categorize brands into disjoint stages of tail, challenger and top with monotonically increased sale bands. We identify a universal set of brand-level metrics as candidate KPIs, and train Random Forest (RF) models to distinguish brand stages using these candidate KPIs as explanatory variables. We use Shapley Additive exPlanations (SHAP) to rank the candidate KPIs for each brand to prioritize KPIs in moving brands from tail to challenger, or from challenger to top stages. We evaluate the stage prediction quantitatively, and the KPI suggestions qualitatively with case studies. We show that our discriminative method using RF and SHAP outperforms the alternate generative models in terms of stage prediction accuracy based on KPIs. We validate our method using 22-month data for 26,369 brands in the select four categories. In addition to accuracy, we show that our model is scalable, taking only 250ms to train an RF model for all brands in a category, while calculating a SHAP value per KPI for each brand takes about 7 minutes. Our case studies showing that brands at different times should prioritize different KPIs, such as time on product page, search rank and conversion rate, are in line with our subjective expectations.

3 - Pacing in Real-time Bidding for Online Display Advertising

Ugurcan Dündar, WU Vienna, Vienna, Austria

Nadia Abou Nabout, Bernd Skiera

Real-time bidding (RTB) is the main ad-selling mechanism in online display advertising. In RTB, publishers auction off their display ad slots for an incoming ad impression through platforms called ad exchanges. Advertisers bid in these auctions to show their ad to the user visiting the publisher's site. When setting up RTB campaigns, advertisers need to decide on how to allocate their budget over a day, which they refer to as pacing. In this paper, we analyze the profitability of two pacing heuristics. We benchmark them against profit-maximizing pacing, which, by definition, achieves higher profits than the two pacing heuristics. Yet, advertisers might refrain from using profit-maximizing pacing because it may be difficult to implement and requires accurate prediction of the number of auctions, the winrate as well as clickthrough and conversion rates on an hourly basis. To this end, we conduct two analyses: In a counterfactual analysis, we compare the profitability of these pacing heuristics in three datasets from actual RTB campaigns. Because the forecasting error in this analysis depends on our predictions of the above metrics, we run a simulation study to understand when a specific pacing heuristic performs best by varying the forecasting error on those predictions.

SD09

Virtual Room 09
Advertising II
Contributed Sessions
Chair: Alicja Grzadziel
Wirtschaftsuniversität Wien, Vienna, Austria

1 - Auctions of Auctions

Robert Zeithammer, UCLA Anderson, Los Angeles, CA
The real-time market for online advertising impressions is facilitated by several layers of intermediaries between the advertisers buying the impressions and the publishers selling them. For every potential advertising impression, online publishers run first-price header auctions to decide which advertising exchange gets to show an ad, and how much should the selected exchange pay. We analyzed a stylized model of two symmetric exchanges, each exclusively representing two advertisers. Each exchange holds and internal first-price auction to determine which of the advertisers it represents should advance to the header auction. Instead of passing the winning advertiser's internal bid through passively, the exchange maximizes its own expected revenue by shading its winning advertiser's bid when it bids on behalf of the advertiser in the header auction. In addition, the exchanges can set reserve prices to further increase their revenue. We characterize the optimal commission and reserve strategies of the exchanges.

2 - Geo-targeted Mobile Advertising for Small Businesses

Mingyu (Max) Joo, Assistant Professor of Marketing, University of California-Riverside, Riverside, CA
Inyoung Chae Jx Alex J Kim
Mobile ad spends in the U.S. have drastically increased from $1.6B in 2011 to $288.1B in 2021, and are projected to surpass $400B in 2024. Large mobile platforms, such as Meta (Facebook/Instagram) and Google, constantly promote their geographically targeted mobile ads as an efficient marketing tool for local businesses. Many small businesses have limited marketing resources and budget, and rely on the local foot traffic. Therefore, geo-targeted mobile advertising may selectively attract relevant prospective consumers who live or work nearby at lower ad costs. Despite the rapid growth, there is little guidance for small business owners on whether geo-targeted mobile ads actually lift their mobile and web traffic, and how the ad effects vary by business categories (e.g., restaurants and hair saloons), store reputations (i.e., franchise vs. independent), and distances from target locations. To answer these questions, this paper investigates a large-scale field study of geo-targeted mobile ads conducted from July 2019 to December 2020 in Seoul, South Korea, a megacity covering an area of 146K acres with nearly 10 billion population.

3 - Influencing the Influencer with Consumer Bias

Luying Wang, Tianjin University, Tianjin, China
Yunchuan Liu
We study the effects of consumer bias on marketer engagement in word of mouth. Influencer posts product review to followers of different beliefs and allows sponsorship from marketer for product promotion. We set up a game theory model to formulate the interaction between firm and influencer. We also use Bayesian persuasion with multiple receivers to model the effect of influencer's product review on consumers' belief updating. Our results suggest that consumer heterogeneity plays an important role in marketer's engagement in influencing marketing on sponsorship volume and product sales. Improved marketing efficiency is achieved through the endogeny of consumer prior belief from homogeneity to heterogeneity. A marketer may strategically target consumer segments based on consumer bias on prior belief through announcing sponsorship disclosure extent in influencer's review. Interestingly, marketer partially sponsors influencer is optimal even if consumer's prior belief is at a high level and marketer partially sponsors influencer is optimal even though consumer's prior belief is at a low level. Sometimes even consumer's belief shows a positive bias on product, the marketer may still be hurt from a higher sponsorship to increase influencer's incentive to post review.

Counter intuitively, we find sometimes consumer's positive bias may hurt the firm but benefit consumers even the actual product fit isn't high enough.

4 - Adverse Effects of TV Advertising on Online Shopping Behavior

Alicja Grzadziel, Vienna University of Economics and Business, Vienna, Austria
Nadia Abou Nabout, Martin Stange, Burkhardt Funk

Mobile devices have changed consumer behavior in various ways, also presenting new challenges and opportunities for TV advertising. Second screen usage is one phenomenon related to these challenges, and describes a situation in which consumers do not watch TV in isolation, but rather use a second screen (e.g., a laptop, tablet or a smartphone) to browse the Internet, search for products and services online, and make purchases while watching TV. The online shopping behavior of consumers who go to a shop's website in response to a TV ad, versus the behavior of those that visit the shop for another reason (e.g., searching for a product using a search engine or clicking a newsletter link) is just starting to be investigated. To the best of our knowledge, this is the first large-scale empirical study to estimate the effects of everyday TV ads on online shopping behavior. We track customers' visits and purchases for up to 90 days after their first visit, and examine the differences of behavior between non-TV-induced and TV-induced customers along the sales funnel. Since we, as researchers, cannot observe consumers in their living rooms, it is impossible for us to know whether a given visit to the online shop is a spontaneous reaction to a TV ad. Therefore, we develop a Bayesian model for the uplift in the number of visits to the online shop for every TV ad aired, which allows us to determine the probability of being TV-induced for every visit to the online shop. We then use this probability to analyze how it affects online shopping, including conversion probabilities, shopping basket sizes, repeat visits, and long-term customer spending. Our results show that a higher probability that a visit to the online shop was induced by a TV ad leads to a lower probability of a conversion, and when that conversion is made, to a lower shopping basket. In the 90 days after their first visit, customers whose first visit to the website was a spontaneous reaction to the TV ad, compared to customers who had been less likely to see the TV ad, make smaller and less frequent repeat purchases.

SD10

Virtual Room 10
Healthcare
Contributed Sessions
Chair: Jong Yeob Kim

NYU Stern School of Business, New York, NY

1 - The Provider Network Selection Problem in Health Insurance Markets

Amin Hosseininasab, University of Florida, Gainesville, FL
Willem-Jan van Hoeve, Sridhar R Tayur

Provider network selection is a central problem in health insurance markets. A provider network consists of healthcare providers that are contracted by an insurer to provide healthcare services at discounted prices to its insured patients. The problem involves selecting which providers to contract, how to group contracted providers into insurance plans, and how to price such plans in order to better target and acquire patients. We develop a novel methodology for optimal provider network selection that is theoretically guaranteed to provide an optimal solution. We further show empirically that our approach improves over methods used in the literature, and the strategies used by a real-world insurer in practice. We finally use the developed methodology to analyze the effects and benefits of optimal provider selection on insurer profits, healthcare costs, and social welfare under different data environments.

2 - Competition Between Branded vs. Generic Prescription Drugs: Theory and Evidence

Jung-Chae Suh, Korea University, Seoul, Korea, Republic of

Drawing on Rochet & Stole (2002), we developed a theoretical model of dynamic nature (i.e., the two period and multi-periods). In order to find the price and brand effects we used structural estimation with an ethical drug category before and after a dominant generic drug's patent expiration. We also dealt with market definition issues in quantifying the consumer welfare effects of generics' entry. Further, we ran a counterfactual analysis for quantifying the value of earlier or later patent expiration due to deals (or possibly called collusion) between the patented brand drug and (the first) generic drug. We suggested managerial and policy implications for law and economics (for regulators and legal experts).

3 - COVID-19, Physician Workload, and Quality of Healthcare

Eunho Park, California State University Long Beach, Long Beach, CA
Haipeng (Allan) Chen

The coronavirus disease 2019 (COVID-19) has undermined the essential health care system. This study aims to examine how the surge in physicians' workload due to the coronavirus influences the quality of health care service for non-COVID-19 patients.

4 - Health Insurance and the Dynamics of Patient Decision Making

Jong Yeob Kim, NYU Stern School of Business, New York, NY

Masakazu Ishihara Jx Vishal Singh

An aging population is considered to be a major factor in the rising of medical expenditures. Patients aged over 65 years made up 16% of the population but accounted for 36% of all health care spending in the US [Centers for Medicare and Medicaid Services, 2016]. This article examines the impact of government insurance expansion for elderly care in the South Korean market. Our research design uses dental insurance expansions for elderly patients in South Korea to examine the patients' hospital utilization and treatment choices as well as the dynamics of patient decision making. Our study uses two main data sets: a national public health survey and an unique, individual-level prescription data from a large university hospital in South Korea. We exploit the price variation in different forms of treatments (dentures vs. implants) to compare outcomes of patients just below the age threshold with those just meeting the age threshold. We then develop a dynamic structural patient life-cycle model to examine patients' strategic delays of treatment and adoption of new technology (implants) under different dental insurance policies. Structural parameters are used to conduct a variety of counterfactuals that provide insights on hypothetical government insurance policies and their impact on patient decision making. We further illustrate how the age threshold can be used as an exclusion restriction to estimate discount factors in the dynamic structural model. Drawing on our findings, we discuss the implications of lowering the age threshold in other contexts, such as Medicare expansion. We also provide insights on adding dental benefits to Medicare, which has been recently proposed by the US Congress.

SD14

Virtual Room 14
Conjoint Analysis
Contributed Sessions
Chair: John McCoy
University of Pennsylvania, Philadelphia, PA

1 - Measuring Preferences for Hedonic Consumption

Hannah H. Chang, Singapore Management University, Singapore

Anirban Mukherjee

Many products are chosen, purchased, and used for hedonic consumption. Examples include watching a movie, listening to music, and getting a massage. We develop a novel consumer preference measurement method for hedonic experiences. In our method, participants are presented with, and choose between, verbally described experiences. To analyze participants' choices, we develop a novel model that fuses state-of-the-art neural language processing with hierarchical Bayesian modeling. Our method and model facilitate (1) the measurement of consumer preferences for hedonic experiences, (2) the computation of the contribution of product attributes to consumers' utility, and (3) the development of counterfactuals that are crucial to the management of hedonic experiences. We apply our method to study preferences for wines made in 427 wine-growing regions, in 44 wine-growing countries, from 708 wine-grape varietals. We show that our model provides superior in-sample description and generates better out-of-sample predictions of participant choices than benchmark models. We use the components of the model for marketing decisions such as choosing between products (wines) that provide distinct hedonic experiences but are observationally equivalent in product attributes and therefore indistinguishable in attribute-based models, and fine-tuning the experience provided by a product (wine) to improve its appeal to consumers.

2 - Two-for-one Conjoint: Bayesian Cross-category Learning for Shared Attribute Categories

John McCoy, University of Pennsylvania, Philadelphia, PA
Rachele Ciulli, Eric T Bradlow

Conjoint analysis is an ubiquitous market research tool used to optimize new product design. As it is normally implemented, each time you wish to understand consumer utilities for a given product category, you run a conjoint study for that category. For example, if you wish to know consumer preferences for frozen yogurt features, you run a conjoint that uses choices between frozen yogurts. In this research, we propose a new conjoint methodology based on transfer learning where the researcher learns about a non-focal product category (e.g. frozen yogurt) by using the results of a conjoint study run on a related category (e.g. ice cream) or a conjoint that uses choices between a product in the focal category and a product in the non-focal category. We demonstrate our approach using three product category pairs (ice cream and frozen yogurt, jackets and bags, and TVs and computer monitors) where categories in a pair have overlapping features. We show how out-of-sample prediction accuracy is improved by using cross-category predictions (in a Bayesian fashion) with both no data and sparse data from the focal category. We demonstrate the effects of cross-category information on managerially relevant decisions.