42nd ISMS Marketing Science Conference

11-13 June 2020

Schedule

Session Times: 9:00 AM -10:00 AM; 10:15 AM-11:15 AM; 11:30 AM-12:30 PM; 12:45 PM-1:45 PM
(All times US Eastern Daylight)

Track	June 11, 2020	June 12, 2020	June 13, 2020
1	Machine Learning	Machine Learning	Machine Learning
2	NLP and Text and Digitization	NLP and Text and Digitization	NLP and Text and Digitization
3	Game Theory	Game Theory	Game Theory
4	Retail and Omnichannel	Retail and Omnichannel	Pricing
5	Advertising	Advertising	Reviews
6	Social	Reviews, UGC, Social	Artificial Intelligence
7	Choice Modeling	Consumer Welfare	Welfare
8	Information Goods	Platforms	Customer Journey and CLV
9	Visual Analytics	Practitioner Sessions	Marketing Mix
10	Product	Methodological Advances	Marketing Strategy
11	Behavioral Modeling	Marketing Applications	
Special Events	9:00 AM – 2:00 PM Lounge	9:00 AM – 2:00 PM Lounge	9:00 AM – 2:00 PM Lounge
	2:00 – 3:00 PM Awards Session	2:00 – 3:00 PM Women's Career Workshop	2:00 – 3:00 PM **Fellows Lunch** (by invitation only)
	3:15 – 4:15 PM Coffee Chats	3:15 – 4:15 PM Coffee Chats	3:15 – 4:15 PM Coffee Chats
Additional Details and Abstracts are available at INFORMS			

To attend a session, click on the Zoom Meeting link and use the password that was emailed to all registrants.

42nd ISMS Marketing Science Conference

Thursday, June 11, 2020, Schedule

Track and Zoom Link	9:00 AM to 10:00 AM	10:15 AM to 11:15 AM	11:30 AM to 12:30 PM	12:45 PM to 1:45 PM	2:00 PM to 3:00 PM
	Contributed Sessions	Special Sessions	Special Events		
1 Machine Learning Zoom Meeting	TA01 Machine Learning, Artificial Intelligence, and Causal Inference in Marketing I	TB01 Machine Learning, Artificial Intelligence, and Causal Inference in Marketing II	TC01 Machine Learning, Artificial Intelligence, and Causal Inference in Marketing III	TD01 Machine Learning, Artificial Intelligence, and Causal Inference in Marketing IV	
2 NLP and Text and Digitization Zoom Meeting	TA02 Digitization 2: Digitization and Job Markets	TB02 Digitization 3: Advertising & Branding	TC02 Digitization 4: Platforms	TD02 Digitization 5: Experiments	
3 Game Theory Zoom Meeting	TA03 Applied Theory in Digital Markets	TB03 Game Theory: Media	TC03 Game Theory: Platforms I	TD03 Game Theory: Platforms II	
4 Retail and Omnichannel Zoom Meeting	TA04 Retail Entry	TB04 Retailing and Market Structure	TC04 Understanding the Retail Consumer: Insights, Implications, and New Directions	TD04 How do Retail Assortment Size and Composition Influence Store Image, Store Choice, and Brand Choice? Review and Future Research Directions	
5 Advertising Zoom Meeting	TA05 Measuring Advertising Effects I	TB05 Measuring Advertising Effects II	TC05 Advertising Response	TD05 Display Advertising	TE01 ISMS Award Session
6 Social Zoom Meeting	TA06 Network and Social Influence 1	TB06 Social Media and Engagement I	TC06 Social Media and Engagement II	TD06 Social Media and Engagement III	
7 Choice Modeling Zoom Meeting	TA07 Choice Modeling IV	TB07 Choice Modeling I	TC07 Choice Modeling II	TD07 Choice Modeling III	
8 Information Goods Zoom Meeting	TA08 Movies and Books	TB08 Games and Gaming Platforms I	No Session	TD08 Games and Gaming Platforms II	
9 Visual Analytics Zoom Meeting	No Session	TB09 Gaining Consumer Insights Using Eye Movement and Biometrics Data	TC09 Visual Image Analysis and ML	TD09 Visual Analytics	
10 Products Zoom Meeting	TA10 New Products and Adoption II	TB10 Internet of Things	TC10 New Products and Adoption I	TD10 Branding	
11 Behavioral Modeling Zoom Meeting	TA11 Behavioral Modeling II	TB11 Behavioral Modeling I	TC11 Improving Forecasts of Consumer and Firm Choices with Neuroscience	TD11 Laboratory Insights Into Consumer Behavior	

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42nd ISMS Marketing Science Conference

Friday, June 12, 2020, Schedule

Track and Zoom Link	9:00 AM to 10:00 AM	10:15 AM to 11:15 AM	11:30 AM to 12:30 PM	12:45 PM to 1:45 PM	2:00 PM to 3:00 PM
Contributed Sessions / Special Sessions / Special Events					
1 Machine Learning Zoom Meeting	No Session	FB01 Machine Learning, Artificial Intelligence, and Causal Inference in Marketing VI	FC01 Machine Learning, Artificial Intelligence, and Causal Inference in Marketing VII	FD01 Machine Learning, Artificial Intelligence, and Causal Inference in Marketing V	FE 01 Women's Career Workshop
2 NLP and Text and Digitization Zoom Meeting	FA02 Text and Sentiment Analysis	FB02 Text and Sentiment Analysis	FC02 Digitization 1: Search and Consumption	FD02 User Engagement in Different Digital Platforms	
3 Game Theory Zoom Meeting	FA03 Game Theory: Behavioral Economics	FB03 Game Theory: Retailing	FC03 Game Theory: Pricing	FD03 Game Theory: Applications I	
4 Retail and Omnichannel Zoom Meeting	FA04 Stores and Retailing	FB04 Omni-Channel Retailing: Insights, Implications, and New Directions	FC04 Global Retail Strategies: Review and New Directions	FD04 Location-Smart Retailing: Unlock the Power of 24/7 Consumer Movement Data	
5 Advertising Zoom Meeting	No Session	FB05 Targeting Communications and Personalized Promotional Offers	FC05 Ad Design and Message	FD05 Investor Advertising	
6 Reviews, UGC, Social Zoom Meeting	FA06 Social Dynamics on Online Platforms	FB06 Insight into Online Communities and Social Influence	FC06 Special Session on Reviews	FD06 New Insights on Advertising and Reviews	
7 Consumer Welfare Zoom Meeting	FA07 Sustainability and CSR	FB07 COVID	FC07 Marketing for Good: The Impact of Marketing Interventions in Emerging Markets	FD07 Marketing & Politics	
8 Platforms Zoom Meeting	FA08 Platforms - Field Experiments	FB08 Platforms I	FC08 Platforms II	FD08 Platforms III	
9 Practitioner Sessions Zoom Meeting	FA09 Strengthening Academia-Industry Collaborations: Ongoing research using data from Wharton Customer Analytics	FBC09 Gary Lilien ISMS-EMAC-MSI 2020 Practice Prize Finalists		FD09 Applied Choice Experiments	
10 Methodological Advances Zoom Meeting	FA10 Spatial and Distance Applications	FB10 Estimating Causal Effects of Marketing Actions	FC10 Bayesian Dynamics and Time Series	FD10 Bayesian Methods and Applications	
11 Marketing Applications Zoom Meeting	FA11 Technological Advances in Education	FB11 ISMS Doctoral Prize winners	FC11 Research in Crowdfunding and Success	FD11 Healthcare Marketing	

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42nd ISMS Marketing Science Conference

Saturday, June 13, 2020, Schedule

Track and Zoom Link	9:00 AM to 10:00 AM	10:15 AM to 11:15 AM	11:30 AM to 12:30 PM	12:45 PM to 1:45 PM	2:00 PM to 3:00 PM
	Contributed Sessions	Special Sessions	Special Events		
1 Machine Learning Zoom Meeting	SA01 Machine Learning Applications I	SB01 Bayesian Perspectives on Applied Machine Learning	SC01 Large-scale Experimentation and Machine Learning	SD01 Machine Learning Applications II	SE 01 Fellows Lunch (by invitation only)
2 NLP and Text and Digitization Zoom Meeting	SA02 Analyzing Unstructured Data for Better Marketing Decisions	SB02 Wisdom from Words: Insights from Natural Language Processing	SC02 Behavioral Insights from Text	SD02 Machine Learning, Natural Language Processing, and Digital Platforms	
3 Game Theory Zoom Meeting	SA03 Game Theory in Sales Management	SB03 Game Theory: Applications II	SC03 Boosting Sales Force Productivity	SD03 Game Theory: Applications III	
4 Pricing Zoom Meeting	SA04 Pricing I	SB04 Pricing II	SC04 Pricing in Display Advertising	SD04 Mobile App Coupon, Mail-in Rebate, and Limited Time Offer	
5 Reviews Zoom Meeting	SA05 Reviews II	SB05 Reviews I	SC05 Reviews III	SD05 Reviews IV	
6 Artificial Intelligence Zoom Meeting	SA06 Technology, AI and (Un)intended Consequences	SB06 Adoption of Algorithms by Firms and Algorithmic Biases	SC06 Artificial Intelligence I	SD06 Artificial Intelligence II	
7 Welfare Zoom Meeting	SA07 Marketing and Welfare I	SB07 Empirical Policy Research 1	SC07 Empirical Policy Research 2	SD07 Marketing and Welfare II	
8 Customer Journey and CLV Zoom Meeting	SA08 Modeling Firms Strategic Decisions with CRM data	SB08 Customer Lifetime Value	SC08 Modeling Customer Churn	SD08 Consumption	
9 Marketing Mix Zoom Meeting	SA09 Digital Marketing Applications	SB09 Promotions - Field Experiments	SC09 Discounts and Incentives	SD09 Purchase and Usage Modeling	
10 Marketing Strategy Zoom Meeting	No Session	SB10 Marketing Strategy and Management I	SC10 Advertising and Firm Value	SD10 Marketing Strategy and Management II	
11	No Session	No Session	No Session	No Session	

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Thursday, June 11, 2020
Session "TA"
9:00 AM - 10:00 AM

TA01. Machine Learning, Artificial Intelligence, and Causal Inference in Marketing I

TA02. Digitization 2: Digitization and Job Markets

TA03. Applied Theory in Digital Markets

TA04. Retail Entry

TA05. Measuring Advertising Effects I

TA06. Network and Social Influence 1

TA07. Choice Modeling IV

TA08. Movies and Books

TA09. NO SESSION

TA10. New Products and Adoption II

TA11. Behavioral Modeling II

Session TA01 **Machine Learning, Artificial Intelligence, and Causal Inference in Marketing I**
01
9:00 AM - 10:00 AM

Presentation 1 **Habit or Benefit: Why People Use AI More?**
Xinyu Cao[1], Dennis Zhang[2], [1]NYU Stern, New York, NY, [2]Washington University in St. Louis, St. Louis, MO
Abstract: This paper studies whether external interventions can catalyze long-term behavioral change, with a focus on AI adoption. Specifically, we investigate whether forced or interrupted AI usage can change people's attitude towards AI and their subsequent AI usage behavior, making use of a field experiment among salespeople in a major online education platform in China. This experiment involved 172 salespeople who were randomly assigned to two treatment groups and one control group. We find that the treatment of forcing salespeople to use AI for a period of time increases their likelihood of using AI by 19.6 percentage points after the experiment compared to those in the control group. On the contrary, the treatment of restricting salespeople from using AI decreases their likelihood of using AI by8.7 percentage points afterwards compared to the control group. We also empirically test the two possible underlying mechanisms---learning and habit formation, demonstrating that both mechanisms co-exist and contribute to the aforementioned treatment effects.

Presentation 2 **AI Algorithms and Rising Concerns of Racial Biases: An Analysis of Airbnb's Smart Pricing Algorithm**
Shunyuan Zhang[1], Nitin Mehta[2], Param Vir Singh[3], Kannan Srinivasan[3], [1]Harvard Business School, Boston, MA, [2]University of Toronto, Toronto, ON, Canada; [3]Carnegie Mellon University, Pittsburgh, PA
Abstract: AI algorithms have sparked concerns that they might produce outcomes that might perpetuate or exacerbate existing racial biases. We examine the implementation of Airbnb's smart-pricing algorithm and derive its market implications across different ethnic groups of Airbnb hosts who adopted it. Prior to its introduction, we find that white hosts earned $8.57 more in average daily rental revenues as compared to black hosts (after controlling for all other observed characteristics), which indicates the presence of biases against black hosts. After its introduction, the revenue gap between white and black hosts on Airbnb further increased by 16.4%, which suggests that the algorithm exacerbated the existing racial biases. However, this result is unconditional on its adoption. Conditional on its adoption, the revenue gap decreased by 57.2%, which shows that the algorithm can substantially mitigate the racial gap in revenues, but the challenge is to enhance its adoption among black hosts. The reason why the algorithm helped black hosts more than white hosts is because while the magnitude of price correction by the algorithm was the same across both black and white hosts who adopted it, the rental-demand for black hosts is much more responsive to price changes as compared to white hosts.

Presentation 3 **Non-linear Effects Of Artificial Intelligence Coach On Sales Agent Performance: A Field Experiment**
Xueming Luo[1], Shaojun Qin[1], Zheng Fang[2], Zhe Qu[2], [1]Temple University, Philadelphia, PA, [2]Fudan University, Shanghai, China.
Abstract: Effective sales training and coaching have long been a challenging task for managers. We examine whether and how this challenge can be tackled by the artificial intelligence (AI) coach, a computer program that leverages cognitive speech analytics and deep learning to analyze sales conversations and provide coaching feedback or job skill training to sales agents. We exploit data from a field experiment that randomly assigns 429 sales agents to have either an AI or human coach in a large fintech company. Our results suggest that the AI coach is 25% more effective than its human counterparts in improving agent performance. An exploration of the underlying mechanism shows that the AI coach {provides feedback with greater breadth and depth, and} is more capable of reducing sales mistakes and boosting positive emotions of the agents, both of which lead to better customer responses and thus higher sales conversion rates. However, there is a non-linear impact of the AI coach on different sales agents: the middle-ranked agents improve the most from the AI coach, followed by the bottom-ranked and top-ranked ones. While the top-ranked agents have a ceiling effect, the bottom-ranked agents suffer from an information overload problem of AI coaching. A follow-up field experiment reveals that restricting the AI feedback amount alleviates the information overload problem for the bottom-ranked agents. To further explore the extent to which the benefits of AI coach can be enhanced by synergizing with other sales management instruments, we derive an optimal compensation plan with the AI coach and find it substantially boosts the firm's overall profits while improving agent income. These findings imply that machines can assist, rather than displace, agents and that the AI coach can be an effective tool for sales force management.

Presentation **Session Chair**
Xueming Luo, Temple University, Philadelphia, PA

Session TA02 **Digitization 2: Digitization and Job Markets**
02
9:00 AM - 10:00 AM

Presentation 1 **Job Search with Signals of Congestion**
Andrey Fradkin[1], Monica Bhole[2], John Horton[3], [1]Boston University, Cambridge, MA, [2]Facebook, Menlo Park, CA, [3]Massachusetts Institute of Technology, Cambridge, MA
Abstract: We study the results of several experiments designed to ameliorate labor market matching frictions. Our empirical context is Facebook Jobs—a relatively new job board layered on top of Facebook. The main goal of the treatments was to inform job seekers which job openings were relatively over or under-subscribed. We find that job-seekers respond strongly to information on both job opening age and job opening "congestion"—or how many applications the job opening had already received. Removing signals of job opening age reduces applications to jobs with relatively few applications by 5%. This result is consistent with job-seekers using opening age as a proxy for congestion, avoiding jobs that are relatively old (and hence already have many applicants). In a second experiment, we show that introducing direct signals of job congestion redirected applications to less congested jobs. Estimates of the increase in application rates to the most under-subscribed job openings are approximately 3%, though interpreting these topline effects requires some subtlety related to precisely how information was conveyed.

Presentation 2 **Automation, Choice of Occupation and Career Value**
Pinar Yildirim, University of Pennsylvania, Philadelphia, PA
Abstract: Using a large dataset of individuals and their occupational history, we create an annual index of occupational transitions, approximating the share of workers moving from occupation to occupation. We investigate how automation - adoption of manufacturing robots. -- impacts occupational transitions and occupational mobility, comparing individuals with varying education and job experience levels, working in different commuting zones in the U.S., as well different industries. We estimate the impact of job transitions on social and political outcomes.

Presentation 3 **The Effect of Minimum Wages on Employer Reputation**
Hannah Catabia, Georgios Zervas, Boston University, Boston, MA
Abstract: Minimum wage law is a fiercely debated topic, inspiring many studies of its effects on the labor market and the economy. In this study, we investigate how minimum wage increases affect low wage workers' opinions of their jobs and the companies that employ them. From 2008 until present, we track minimum wage changes across the United States at the federal, state and city level. We also collect reviews published on Glassdoor.com over the same time period. Glassdoor is a popular website that allows users to anonymously post public reviews of their workplaces. These reviews contain ratings, which we analyze to understand how low-wage workers view many topics, including company culture, work-life balance, and CEO performance. We also examine the written portion of the reviews to learn how minimum wage laws affect the language that employees use to describe their work experiences.

Presentation **Session Chair**
Georgios Zervas, Boston University School of Management, Brookline, MA

Presentation **Session Chair**
Pinar Yildirim, University of Pennsylvania, Philadelphia, PA

Session TA03 **Applied Theory in Digital Markets**
03
9:00 AM - 10:00 AM

Presentation 1 **When (not) To Persuade Customers?**
Ron Berman[1], Yi Zhu[2], [1]The Wharton School, Philadelphia, PA, [2]University of Minnesota, Minneapolis, MN
Abstract: We test the boundaries of Bayesian persuasion, and find that the incentives to persuade are diminished when a firm has pricing power, leading to full truth revelation. This is a consequence of a fundamental tradeoff created by persuasion that increases the consumer's chance of purchase while simultaneously decreasing their willingness to pay. The same result appears under price competition, even though firms do not have monopolistic pricing power. Platforms, however, might have an incentive to soften competition among sellers on the platform. Consequently, there are cases where platforms might want to deviate from fully revealing information design and persuade consumers to purchase lower quality products.

Presentation 2 **Reputation with Replacement: The Negative Effects of Positive Selection**
Aniko Oery[1], Jack Fanning[2], [1]Yale School of Management, New Haven, CT, [2]Brown University, Providence, RI
Abstract: A platform's reputation stems from the quality of users and the efforts undertaken by the users. For example, UBER's reputation hinges on the unobserved abilities and efforts of its drivers. While the users may also care about the reputation of the platform, they bear the cost of effort, so platforms try to discipline its users by excluding them from the platform after a bad outcome has occurred. Such a bad outcome can be a result of bad quality or low efforts. In a model in which parties have a limited memory about the past and only observe the user's tenure on the platform, we show that the ability of a platform to fire can have detrimental effects. It increases the average quality of workers on the platform, but this in turn can destroy the worker's incentives to exert effort. In fact, for sufficiently high discount factors, the ability to fire can destroy any incentives to exert effort.

Presentation 3 **An Economic Analysis of GDPR: Will it Hurt or Help Digital Marketers?**
T. Tony Ke[1], K. Sudhir[2], [1]MIT, Cambridge, MA, [2]Yale School of Management, New Haven, CT
Abstract: GDPR is built around the idea that the consumers own their data. This leads to three significant requirements for firms related to consumer data: (1) consumers need to explicitly opt in, (2) consumers can require that firms erase their data (right to be forgotten), and (3) firms need to make consumer data portable and available to other competitors upon the consumer request. We investigate the implications of these three requirements of GDPR for digital marketers in the long run by endogenizing consumers' opt-in, erasing and switching decisions over time. Consumers' data empower the firms to provide personalized service while at the same time engage in price discrimination, at the cost of consumers' compromise on privacy. We show that that the threat of data portability and right to be forgotten discipline firms from perfect price discrimination, resulting in trust among consumers about not being held up in the future and an increase in consumer opt-in. GDPR can lead to not just improved consumer protection and surplus, but also may help the industry in the long run. Firms benefit most from GDPR when the data transferability among firms is intermediate.

Presentation 4 **Alone, Together: Product Discovery Through Consumer Ratings**
Tommaso Bondi, Cornell Tech & Johnson, New York, NY
Abstract: Consumer ratings have become a prevalent driver of choice. I develop a model of social learning in which ratings can inform consumers about both product quality and their idiosyncratic taste for them. Depending on consumers' prior knowledge, I show that ratings relatively advantage lower quality and more polarizing products. The reason lies in the stronger positive consumer self-selection these products generate: to buy them despite their deficiencies, their buyers must have a strong taste for them. Relatedly, consumer ratings should not be used to infer product design: what is polarizing ex-ante needs not be so among its buyers. I test these predictions using Goodreads book ratings data, and find strong evidence for them. Goodreads appears to serve mostly a matching purpose: tracking the behaviour of its users over time reveals an increasing degree of specialization as they gather experience on the platform: they rate books with a lower average and number of ratings, while focusing on fewer genres. Thus, they become less similar to their average peer. Taken together, the findings suggest that consumer ratings contribute to both the long tail and, relatedly, consumption segregation. For managers, this illustrates, counterintuitively, the reputational benefits of polarizing products, particularly early in a firm's lifecycle, but only when paired with the ability to match with the right consumers.

Presentation **Session Chair**
Tommaso Bondi, Cornell Tech & Johnson, New York, NY

Session TA04 **Retail Entry**
04
9:00 AM - 10:00 AM

Presentation 1 **Franchise Encroachment In Dynamic Retail Competition**
Mitsukuni Nishida, Johns Hopkins Carey Business School, Baltimore, MD, Contact: nishida@jhu.edu
Abstract: This paper quantifies the trade-off of a policy prohibiting franchise encroachment in the context of dynamic competition of retail chains. When a franchisor places a new company-owned or franchised outlet too close to its existing outlets ("franchise encroachment"), it has mixed implications for these existing outlets. On one hand, the profits of the existing outlets may increase due to several reasons, including increased brand awareness and successful entry deterrence of competitor chains. On one hand, the sales of the existing outlets may decrease due to own-brand business-stealing effects. To evaluate this trade-off, the paper utilizes a long panel from the convenience-store industry in Japan between 1984 and 2010, which contains information on annual store counts and sales for both franchised and company-owned outlets in many geographic markets. I construct and estimate a structural model in which forward-looking firms strategically choose entry, expansion, and franchising decisions (i.e., franchised and company-owned outlets). I then simulate the estimated model to study the effect of introducing a policy that permits exclusive territories on the profits of franchisees and franchisors in an equilibrium. The implications for franchising research and practice are discussed.

Presentation 2 **The Impact Of Organic Store Entry On Traditional Store Performance**
Stijn Maesen[1], Lien Lamey[2], Anne ter Braak[2], [1]Imperial College Business School, London, United Kingdom; [2]KU Leuven, Leuven, Belgium.
Abstract: Traditional retailers increasingly face competition from organic retailers like Whole Foods who open new store outlets to benefit from the growing desire for organic food amongst consumers. While traditional retailers increasingly face competition from organic retailers, little is known about the conditions under which traditional retailers are more or less harmed. This study examines this impact looking at grocery sales from 47 packaged food and beverages categories, carried by 38 grocery stores from five traditional retailers near three store entries of one organic retailer, as well as control stores from the same traditional retailers not exposed to the entries. While the findings indicate that traditional retailers suffer significant performance losses after the organic store entry, we show how the traditional retailer's assortment can be leveraged to mitigate this loss.

Presentation 3 **The Causal Impact Of Mall Entry On Incumbents: The Role Of Substitution, Agglomeration And Life Cycle**
Haojun Gao[1], **Keyan Zhu**[2], Cheng He[3], Tong Wang[4], Yu Jeffrey Hu[5], [1]University of Electronic Science and Technology of China, Chengdu, China; [2]Peking University, Beijing, China; [3]Georgia Institutes of Technology, Atlanta, GA, [4]University of Iowa, Iowa City, IA, [5]Georgia Institute of Technologuy, Atlanta, GA, Contact: zhu_ky@pku.edu.cn
Abstract: In this paper, we employ a multitude of quasi-experimental methods to examine the causal impact of mall entry on the incumbent malls in the same commercial district. The results suggest that incumbent malls on average lose customer traffic by 3.4% after the entry. This effect is more salient for incumbents at moderate distances (5 to 10 minutes' walk) from the entrants. Moreover, newer incumbents and incumbents in more mature commercial districts suffer larger traffic losses. Our findings shed light on the mechanisms driving mall customer traffic, namely agglomeration effect and substitution effect, as well as their variation in the life cycle of malls and commercial districts.

Presentation 4 **A SpatialMultivariate Model To Predict Demand Of A New Store Without History Data**
Yang Pan[1], Gary J. Russell[2], Thomas S. Gruca[2], [1]McMaster University, Hamilton, ON, Canada; [2]University of Iowa, Iowa City, IA
Abstract: Large retail chains commonly open tens of thousands of new stores in any given year. Prior to opening the store, it is useful for managers to understand the preference patterns of consumers in the trading area and how these consumers react to changes in the marketing mix. In this research, we propose a spatial market basket model for retail site selection. The market basket modelling system is based upon the MVL (multivariate logistic) choice model theory. Due to a correspondence between the MVL and Poisson regression, the market basket model can be easily calibrated using standard statistical software. By calibrating the market basket model parameters for a sample of stores within a chain, we can build up a spatial model that predicts the demand for baskets in the new store, given the new store's location and characteristics. In effect, the model projects the response parameter vectors of existing stores into a spatial system that allows us to predict the response parameters of a market basket model for any set of geographical coordinates. The result is a basket forecasting system that provides managers with insights into optimal product assortment, price sensitivity and promotional response at the new location. Using data from a convenience store chain, we demonstrate the modeling system yields excellent forecasts of market basket responses of the potential new store and provides clear directions for marketing strategy.

Presentation **Session Chair**
Yang Pan, Louisiana State University, Baton Rouge, LA

Session TA05 **Measuring Advertising Effects I**
05
9:00 AM - 10:00 AM

Presentation 1 **Large-scale Exploration of Experimental vs. Non-experimental Measurement in Advertising**
Brett R. Gordon[1], Robert Moakler[2], Florian Zettelmeyer[1], [1]Kellogg School of Management, Evanston, IL, [2]Facebook, New York, NY
Abstract: Advertisers often rely on observational techniques to estimate a campaign's effectiveness when they are unable to utilize randomized controlled trials (RCTs). This paper compares ad effects obtained using observational techniques to their RCT counterparts for the same set of ad campaigns to determine under which conditions observational approaches deliver accurate estimates of causal advertising effects. The analysis uses a unique data set of over 700 ad campaigns on Facebook with at least one million users, all from the second half of 2019 in the United States. The campaigns represent several hundred distinct advertisers across about 15 industry verticals, with the average campaign having eight million users and a budget exceeding $100K. By making a comparison at this scale of studies, we aim to provide generalizable insights to help advertisers understand the conditions under which observational methods are most reliable. We characterize the results across three types of campaign attributes: (1) those advertisers can change (e.g., targeting rules, campaign budget), (2) those advertisers cannot change (e.g., industry vertical, baseline conversion rate), and (3) non advertiser-specific attributes (e.g., observational model fit, exposure rate). A preliminary analysis indicates that the baseline conversion rate---the probability of conversion in the randomized control group---is an important characteristic that determines the ability of observational methods to recover an accurate causal estimate. We explore additional attributes and disentangle their relative importance to provide further findings.

Presentation 2 **Parallel Experimentation In A Competitive Advertising Marketplace**
Xiliang Lin[1], **Harikesh Nair**[2], Navdeep S. Sahni[3], Caio Waisman[4], [1]Mountain View, CA, [2]Stanford University, Stanford, CA, [3]Stanford, Stanford, CA, [4]Northwestern University, Chicago, CA
Abstract: When multiple firms are simultaneously running experiments on a platform, the treatment effects for one firm may depend on the experimentation policies of others. This paper presents a set of causal estimands that are relevant to such an environment. We also present an experimental design that is suitable for facilitating experimentation across multiple competitors in such an environment. Together, these can be used by a platform to run experiments "as a service," on behalf of its participating firms. We show that the causal estimands we develop are identified nonparametrically by the variation induced by the design, and present two scalable estimators that help measure them in typical high-dimensional situations. We implement the design on the advertising platform of jd.com, an eCommerce company, which is also a publisher of digital ads in China. We discuss how the design is engineered within the platform's auction-driven ad-allocation system, which is typical of modern, digital advertising marketplaces. Finally, we present results from a parallel experiment involving 16 advertisers and millions of jd.com users. These results showcase the importance of accommodating a role for interactions across experimenters and demonstrates the viability of the framework.

Presentation 3 **Generalizable and Robust TV Advertising Effects**
Bradley Shapiro, University of Chicago, Chicago, IL
Abstract: We provide generalizable and robust results on the causal sales effect of TV advertising for a large number of products in many categories. Such generalizable results provide a prior distribution that can improve the advertising decisions made by firms and the analysis and recommendations of policy makers. A single case study cannot provide generalizable results, and hence the literature provides several meta-analyses based on published case studies of advertising effects. However, publication bias results if the research or review process systematically rejects estimates of small, statistically insignificant, or "unexpected" advertising elasticities. Consequently, if there is publication bias, the results of a meta-analysis will not reflect the true population distribution of advertising effects. To provide generalizable results, we base our analysis on a large number of products and clearly lay out the research protocol used to select the products. We characterize the distribution of all estimates, irrespective of sign, size, or statistical significance. To ensure generalizability, we document the robustness of the estimates. First, we examine the sensitivity of the results to the assumptions made when constructing the data used in estimation. Second, we document whether the estimated effects are sensitive to the identification strategies that we use to claim causality based on observational data. Our results reveal substantially smaller advertising elasticities compared to the results documented in the extant literature, as well as a sizable percentage of statistically insignificant or negative estimates. If we only select products with statistically significant and positive estimates, the mean and median of the advertising effect distribution increase by a factor of about five. The results are robust to various identifying assumptions, and are consistent with both publication bias and bias due to non-robust identification strategies to obtain causal estimates in the literature.

Presentation **Session Chair**
Bradley Shapiro, University of Chicago, Chicago, IL

Session TA06 **Network and Social Influence 1**
06
9:00 AM - 10:00 AM

Presentation 1 **Will It Spread? The Role of Consumer Susceptibility in the Diffusion Process**
Radu Tanase[1], Manuel Sebastian Mariani[2], Zhao Yang[3], Rene Algesheimer[2], [1]University of Zurich, Zurich, Switzerland; [2]University of Zurich, Zurich, Switzerland; [3]University of Zurich, Zurich, Switzerland.
Abstract: The opportunity to capitalize on social contagion has led many firms to invest significant resources in designing viral products and identifying the best seeding strategies. While extensive literature has been devoted to addressing both topics, incorporating this knowledge to predict and engineer product virality remains a difficult task. In this article, we examine whether the diffusion of a new product can be predicted based on individual, product and social network characteristics. To this end, we integrate a lab experiment with an agent-based model of product diffusion, and validate our results on empirical data. In the lab experiment, we use a conjoint design to measure the individual susceptibility to social influence from observed product choices. We show that susceptibility is dependent on the interplay between product and individual characteristics. We use the experimental results to calibrate an agent-based model of new product diffusion in a social network. We quantify the success predictability of different products, the potential outcome and risk associated with seeding strategies, and the role played by product and network characteristics on cascade size. 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. We validate our results on susceptibility inference and diffusion predictability in an empirical study of an online food community (1M users) where we observe the diffusion of over 75'000 user-generated recipes over 10 years. 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.

Presentation 2 **Demand Spillover Of Add-ons: The Role Of Network Homogeneity**
Pallav Routh, University of Texas at San Antonio, San Antonio, TX, Contact: pallav.routh@utsa.edu
Abstract: Add-ons are additional features that can expand and enhance the benefits provided by a base-product. An add-on launch segments the market into adopters who favor the optional features and non-adopters who continue using the base-product. Furthermore, for add-ons sold on online-platforms, the adopters and non-adopters can form separate networks where they interact among themselves. Moreover, due to the presence of network externalities on online-platforms, the benefit to an average adopter increases as more base-product users join the add-on network. Consequently, it is expected that while benefit increases among adopters, there is either no change or a decrease in benefit for non-adopters as the network of non-adopters shrinks. However, in our investigation of add-ons in the video-gaming industry, we observe that an increase in benefit to add-on adopters causes an increase in the benefit to non-adopters as well. This article empirically investigates this positive spillover from adopters using an add-on to non-adopters using the base product. We attribute the reason for the spillover to the tendency of non-adopter networks to become more homogenous in composition following the launch of the add-on. Specifically, we find that as the composition of skills of users in the base product network becomes more homogenous, it increases a consumer's utility even though the size of the network reduces. A negative implication of the idea that add-on launch can cause non-adopters to gain (in terms of benefits), is that add-on sales may be lower than expected, which is an important consideration when forecasting the return on investments from add-on campaign. However, we show that network homogeneity has an indirect positive implication for the firm - in the long run, benefits from network homogeneity eventually increases the likelihood of non-adopters to switch to add-ons or the next upgrade.

Presentation 3 **Social Networks On Knowledge Markets: A Double-edged Sword?**
Mengxia Zhang, Lan Luo, University of Southern California, Los Angeles, CA, Contact: mengxia@marshall.usc.edu
Abstract: In the era of information explosion, getting useful information is like finding "a needle in a haystack". Consequently, online knowledge-sharing platforms are increasingly relying on peer voting systems to harness the wisdom of the crowds. Meanwhile, some (but not all) platforms also integrate social networks to motivate content contribution. In this research, we investigate whether such platforms should incorporate social networks in the presence of peer voting. We first ran a field experiment to examine the causal effects of peer voting and social networks on knowledge contribution by exogenously increasing the total number of upvotes or/and the total number of followers on a major online knowledge-sharing platform in March and April 2018. The experiment shows that in general, peer voting is more effective than social networks in stimulating knowledge contribution. We further develop a dynamic forward-looking model to estimate each user's intrinsic utility and status-related utility that either motivate or discourage content contribution, using daily observational data from 1,410 users from January 2018 to January 2019. Lastly, we carry out a policy simulation to turn off social networks on the knowledge market. To our knowledge, this is the first study to examine whether knowledge markets should incorporate social networks in the presence of peer voting. As such, our research has important policy implications for platform design of knowledge markets.

Presentation 4 **Intrahousehold Spillover Effects In A Multichannel Environment**
Hyung Sup Bhan, Tulane University, New Orleans, LA, Contact: hbhan@tulane.edu
Abstract: Although many firms recognize that individuals within a household may have distinct preferences, their interconnected behaviors in multichannel environments have received far less attention. Using a major apparel retailer's data, I measure the intrahousehold spillover effect and document its unique patterns. A major challenge in identification is that household members' actions are inherently confounded in many ways. To isolate the intrahousehold spillover effects, I leverage browsing based email targeting as an exclusion restriction. In the Internet channel, a household member's purchase in the previous week increases the purchase probability of the spouse by 5-10%. This spillover is not limited within online and broadly extends across channels—a customer's purchase from the Internet also triggers the spouse to buy in offline channels. Interestingly, historically low spenders display greater influence on their spouse. Lastly, intrahousehold spillovers are larger when a customer buys items that are relevant to the spouse's gender, but this pattern is moderated by household resources. Overall, even when targeting individual customers, this research emphasizes the importance of factoring in not only their own data but also potential familial network effect.

Presentation **Session Chair**
Hyung Sup Bhan, Tulane University, New Orleans, LA

Session TA07 **Choice Modeling IV**
07
9:00 AM - 10:00 AM

Presentation 1 **At Home Or Store? An Optimal Sequential Logit Model Of Preplanned Versus Impulsive Purchases**
Parichehr Kianian, James D. Hess, Jacqueline Kacen, Bauer College of Business, University of Houston, Houston, TX, Contact: pkianian@bauer.uh.edu
Abstract: In this paper, we propose the optimal sequential logit model (OSL) and its application to purchase decisions in the grocery shopping context. OSL is a discrete choice model that explains choice decisions made in two stages and it accounts for the role of decision-maker's anticipation of the future in the decision making process. Previously suggested discrete choice models cannot explain this type of sequential decisions. Multinomial and nested logit models assume that the decision-maker makes the choice by considering all the alternatives simultaneously, which is not true in case of sequential decisions. On the other hand, sequential logit does account for decisions with multiple stages, however, it assumes that in the first stage of a sequential decision, the decision-maker has no anticipation about the choice situation in the second stage. We develop a model of sequential choices that assumes the decision-maker anticipates future situations even if the details are not known with certainty. This model is then applied to the grocery shopping context. We use this model to study a choice situation where the shopper has three alternatives for purchasing a product: preplan, impulse-buy, or consider but no-buy and makes the decision in two stages: at home and at store. The choice between the alternatives are not made simultaneously. Furthermore, not all aspects of the product are known until the customer is in the store. At last, the estimation results of the OSL are compared to those of a nested logit model in explaining shopper's behavior in this decision making context.

Presentation 2 **Estimating Preference And Willingness-to-pay For Fair Trade Products Using Market Share Data**
Mahmoud Ahmed, Ossama Elshiewy, Yasemin Boztuğ, University of Goettingen, Goettingen, Germany. Contact: mahmoud.ahmed@uni-goettingen.de
Abstract: Fair Trade (FT) products aim for better trading conditions for farmers and producers in developing countries. Consequently, many food manufacturers have started selling FT products and use FT labels to signal this characteristic to consumers. A large number of research analyzing stated-preference (SP) data has found that consumers have higher preference and willingness-to-pay (WTP) for FT products compared to conventional products (Andorfer & Liebe, 2012). However, actual market shares for FT products remain lower than predicted by this research stream. One possible explanation could be that such estimates of preference and WTP for FT products are overestimated due to intention-behavior gaps and socially desirable response using SP data. Previous research using actual market data to estimate preference and WTP for FT products is scarce and has only used hedonic pricing models applied to cross-sectional data. From this background, we attempt to overcome the limitations from previous research and estimate a discrete choice model applied to longitudinal market share data (Berry, Levinsohn, & Pakes, 1995). We employ data with coffee purchases from the years 2012 to 2018 to estimate preference and WTP for FT coffee. Parameter estimates allow us to analyze preference and WTP for FT coffee compared to conventional coffee while accounting for a number of control variables (but also price endogeneity as well as observed and unobserved consumer heterogeneity; see, e.g., Chu, Chintagunta, & Vilcassim, 2007). We find that consumers are willing to pay a positive price premium for FT coffee. Our estimate from longitudinal market share data is higher than estimates from previous research using hedonic pricing models and shows variation as a function of observed consumer heterogeneity. Consequently, our results allow improved implications for food marketers and policymakers.

Presentation 3 **On The Estimation Of Cardinal Multi-attribute Utilities From Stated Preferences**
Dan Horsky, University of Rochester, Rochester, NY, Contact: dan.horsky@simon.rochester.edu
Abstract: The estimation of cardinal multi-attribute utilities of choice alternatives based on stated preferences by individuals is of major interest. A crucial question in such estimation is the scale the stated preferences are to be elicited on. Should it be an interval or ordinal scale? An interval scale may provide a direct measure of the cardinal utility level but may be measurement error prone. An ordinal scale may involve less measurement error but does it imply that a cardinal utility exists? In this paper we provide theoretical , simulation and predictive results that identify ordinal pairs and pairs-of-pairs preference comparisons as promising foundation for estimating cardinal multi- attribute utilities. Ordinal pairs and pairs-of-pairs preference comparisons are the minimum information necessary theoretically to assume a cardinal utility function. These type ordinal preference data are easily generated from commonly collected stated preference measures including ones currently used in choice based conjoint studies. We will suggest estimation procedures for the analyses of such preference data and evaluate their performance through simulations and two published data sets.

Presentation 4 **When Fashion Firms Choose Their Customers For Brand Image: A Two-sided Matching Approach**
Alex Yao Yao[1], Yuwei Hsieh[2], Sha Yang[2], [1]San Diego State University, San Diego, CA, [2]University of Southern California, Los Angeles, CA, Contact: yyao2@sdsu.edu
Abstract: Many fashion companies strategically target preferred consumers, because such consumers not only generate revenue, they also influence the companies' brand image. It is important to jointly model the preferences of consumers and firms in this scenario, because observed brand choice is an outcome of mutual selection from both sides. We develop a two-sided matching framework to model demand as realized from such a two-sided selection process. An entry model is embedded to capture the endogenous price-line decisions. To cope with computation challenges in the model estimation, we apply approximate Bayesian computation and parallel computing techniques. Applying the proposed structural model to consumer demand for fashion brands, we find empirical support for mutual preferences, and a standard discrete choice model leads to biased parameter estimates. In counterfactual analyses, we show how fashion brands would adjust their price-line strategies if they prioritized short-term revenue compared to brand image.

Presentation **Session Chair**
Alex Yao Yao, San Diego State University, San Diego, CA

Session TA08 **Movies and Books**
08
9:00 AM - 10:00 AM

Presentation 1 **Causal Recipes For Predicting The Box-office Success Of Bollywood Movies**
Nilakantan Narasinganallur[1], **Krupa A. Rai**[2], [1]K J Somaiya Institute of Management, Mumbai, India; [2]K J Somaiya Institute of Management, Mumbai, India. Contact: krupa.r@somaiya.edu
Abstract: Fuzzy logic is an approach to computing based on “degrees of truth” rather than the usual “true or false” Boolean logic on which modern computing is based. This paper aims at introducing fuzzy set qualitative comparative analysis (fsQCA) as an innovative approach in developing a model to predict the success of Indian Hindi Cinema or ‘Bollywood’ movies and their probable Box-office collections. The application of fsQCA in this domain is still in its infancy. We observed that there are no academic research conducted to predict commercial success for any kind of media or entertainment. The prediction of the success of Bollywood movies and their possible collections is difficult, especially when movies are known to have short product life cycles. We collected data from 1996-2018, 138 movies from 12 different genres of top 10 directors were used. Three causal conditions viz., ratings for the movie, first week’s earning and promotions were formulated. We argue that it is important for the stakeholders to have a robust model in order to reduce the uncertainty of this industry. The paper shows how a set-theoretical approach can be used for predicting success. This is done by providing a framework, which determines causal conditions, and configurations of such conditions, and how these contribute to predicting success and thus the box-office collections. The paper also aims at defining the parameters that govern this ‘success’ thereby reducing a certain level of uncertainty.

Presentation 2 **Charging at Second Culmination? Optimal Freemium Pricing for E-books via Field Experiment and Text Analysis**
Hanbing Xue[1], Yongjun Li[1], Yangfeng Ji[2], Natasha Zhang Foutz[2], [1]University of Science and Technology, Beijing, China; [2]University of Virginia, Charlottesville, VA
Abstract: Digital entertainment products, such as e-books, movies, and video games, commonly leverage freemium pricing, i.e. offering early content to customers for free in hope to monetize later content. While offering scant free content risks customer churn, offering a lavish amount undermines profit. This research hence aims to identify a product-specific profit-maximizing “charging point” and how it is linked to content peaks/troughs experienced by consumers by leveraging a large-scale field experiment with 1.5 million consumers and content mining of 56 e-books. The optimal charging point identified by the field experiment escalates purchase up to 67% and typically occurs right after the second culmination based on sentiment analysis of book content. These findings will critically guide premium pricing strategy and automate the conventionally intuition-laden and labor-intensive pricing decisions by content creators.

Presentation 3 **Sequels as Means of Brand Expansion: Market Size and Product Life-cycle**
Vinay Kanetkar, University of Guelph, Guelph, ON, Canada.
Abstract: Theatrical presentation of movie as a brand have short life, about 10 weeks.Sequel to movie can be considered brand extension. Based on empirical evidence suggest that sequels are more successful compared to non-sequel moviesin cross sectional data. In this paper, success of sequel is studied not basedon other original movies but prior sequels. In the last 40 years, institutionalchanges, particularly ownership of studios by investors and multiplex the-atres housing several screens at one location has changed lives of movies orbrands. In this paper, an alternative model is proposed to account for totalaudience (brand expansion) and half-life of movie (brand extension). Moviesequel allows studios to produce revenue steam at less risk than original movie.There were two sets of analysis to determine attendance of new sequel givenattendance of prior sequel movie. We collected data for 60 sequels whichrepresented 280 movies. In addition, we estimated statistical models usingdaily box-office revenue data for 32 sequels accounting for 126 movies suggestthat on an average sequels have potential lower market size and shorter halflives compared to the original. This research contributes to markets whereproduct life cycles are short and there are multiple competing brands.

Presentation 4 **A Familiar Story But (Some) Different Actors? Impact of Content and Execution Similarities on Success of Hedonic Produce Line Extension**
Jieqiong Zhang[1], Yangfeng Ji[2], Natasha Zhang Foutz[2], Weihe Gao[1], [1]Shanghai University of Finance and Economics, Shanghai, China; [2]University of Virginia, Charlottesville, VA
Abstract: Numerous industries, such as entertainment and technology, profit and prosper from successful product line extensions. Hollywood, for example, accrues around 48% annual revenues from movie sequels in 2019. Despite a rich literature examining utilitarian products, little is understood on the factors contributing to the success of line extensions of hedonic products. Drawing from the Sensation-Familiarity framework and examining a canonical example of hedonic products - movie sequels, we conceptualize sequel success, measured on a multitude of dimensions, as driven by content similarity and execution similarity between parent and extension products. We further operationalize content similarity as topic similarity, sentiment similarity and character similarity via automatic text analysis of the complete scripts of 734 franchise movies released over the past 62 years; and execution similarity as studio-, cast power-, crew power-, and production team member- turn-over rates. The analysis reveals that high content similarity is positively linked to word-of-mouth valence and Oscar nominations, whereas intermediate execution similarity leads to heightened box office. These findings will offer powerful guidance to content creation, line extension, talent management, and other related new product strategies.

Presentation **Session Chair**
Jieqiong Zhang, Shanghai University of Finance and Economics, Shanghai, China.

Session TA09
09
9:00 AM - 10:00 AM

NO SESSION

Session TA10 **New Products and Adoption II**
10
9:00 AM - 10:00 AM

Presentation 1 **GRAVITATIONAL FORECAST RECONCILIATION**
Carla Freitas Silveira Netto[1], Mohsen Bahrami[2], **Vinicius Brei**[3], Burcin Bozkaya[4], Selim Balcısoy[5], Alex Pentland[6], [1]University of Bologna, Bologna, Italy; [2]MIT Media Laboratory, Cambridge, MA, [3]Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil; [4]Sabanci University, Istanbul, Turkey; [5]Sabanci University, Istambul, Turkey; [6]MIT, Cambridge, MA, Contact: brei@ufrgs.br
Abstract: When organizations plan to enter a new market or to expand their business to new locations, they need to forecast sales in those geographical disaggregated levels to implement their desired marketing strategy. However, such disaggregated data regarding sales time-series or final consumers' data are hardly available and are expensive to acquire, which may seriously undermine the organizations' forecasting efforts. Based on agglomeration and gravitational theories, we propose a new forecast reconciliation approach that distributes and reconciles an aggregated forecast to lower levels, when no actual disaggregated sales data or historical sales proportions are available. We combine the deep learning technique Long Short-Term Memory (LSTM) applied to time-series forecasting with a new gravitational model approach inspired in Huff's gravity model and validate our method with real sales data of two different companies from two different countries. Our gravitational forecast reconciliation (GFR) approach has the advantage of, instead of using historical proportions, it distributes the total sales among more granular levels with a gravitational model built with easily/publicly available and/or low-cost geographical POI data. The results show that our GFR approach based on easily or freely available data has a similar or better performance than the benchmark approaches that make use of proprietary sales data at all levels of the hierarchy.

Presentation 2 **Sales Of A Complex New Product When Salespeople Compete**
Vahideh Abedi[1], Rahul Bhaskar[2], [1]Cal State Fullerton, Orange, CA, [2]California State University-Fullerton, Rancho Santa Margarita, CA, Contact: vabedi@fullerton.edu
Abstract: Purchase of complex new products (e.g. insurance plans) typically depends on customer word-of-mouth both about the new characteristics of the product and about the quality of service of one or more brokers or salespeople. We show that this leads to synergy between brokers that has not been explored in the literature in this context. We model this sales process, and validate it from membership data for an insurance product. We measure the synergy effect, and show how the resulting model can measure the marginal value of a broker and can facilitate decision making in managing the sales force.

Presentation 3 **Estimating Changes In Adoption Dynamics Between Generations**
Oliver Schaer[1], Nikolaos Kourentzes[2], [1]University of Virginia, Charlottesville, VA, [2]University of Skövde, Skövde, Sweden. Contact: schaero@darden.virginia.edu
Abstract: Adoption dynamics can change between generations of products, as the market reality evolves. We propose a new way to estimate changes from previous generations, relying on bootstrapping to identify significant changes in the coefficients of adoption curves across generations. This methodology enables us to understand which aspect of adoption has changed between generations and which has remained unchanged, beyond the market potential, giving insights in how to market evolves. Furthermore, as the proposed approach allows us to test when parameters have evolved or not, we can achieve more efficient estimation. To demonstrate its efficacy, we empirically evaluate the method on a set of new technology and product adoption cases.

Presentation 4 **Spillover Effect of Limited Edition Strategy**
Tuan Nguyen, Northeastern University, Boston, MA, Contact: nguyen.tuan1@northeastern.edu
Abstract: Limited edition (LE) is a common marketing strategy in which a firm commits to limit the supply of its new products. Despite being viewed as a brand promotion mechanism, little is known about the effect of LE on the demand for other new products. I use a unique data set of a fashion firm from an online resale market and find robust evidence of a positive spillover effect of LE products on the demand for related products. I also develop a theoretical model that explains the empirical evidence and demonstrates that LE increases firm profits under spillover effect and resale conditions.

Presentation **Session Chair**
Tuan Nguyen, Northeastern University, Boston, MA

Session TA11 **Behavioral Modeling II**
11
9:00 AM - 10:00 AM

Presentation 1 **Context-dependent Drivers: The Impact Of Air Pollution On Consumer Borrowing Behavior**
Xiaodan Zhang[1], Tongyao Shen[2], [1]Peking University, Beijing, China; [2]Penn State University, State College, PA
Abstract: The increasingly severe air pollution in many developing countries has drawn the attention of both governments and scholars. Previous research has mainly focused on the effect of air pollution on individual physiological and psychological health, as well as non-health consequences, i.e., lower labor productivity, lower student test scores, more organic food consumption, and higher insurance purchase. However, research is limited in the area of personal financial behavior. In this paper, we aim to investigate the effect of air pollution on consumer's borrowing behavior, as well as the mechanism of the effect. We develop a set of theoretical predictions on how air pollution impacts loan behavior. Utilizing four million unique loan data from a large Chinese finance company and air quality data, we find that when air quality gets worse, more consumers borrow the long-term loan. The long-term loan has a higher loan amount and a more extended repayment period, such as two months, three months, and five months than the short-term loan. Oppositely, when air quality gets worse, fewer consumers borrow the short-term loan, which has a lower loan amount and a relatively shorter repayment period, such as one week, two weeks, and one month. The results are consistent with both individual-level data and aggregate-level data. The potential mechanism is also discussed. Some research shows that severe air pollution can arouse the salience of health issues and even death, which makes consumers overestimate the discount rate. They may expect erroneously that the present value of the money is higher than the future value of the same amount of money. Therefore, by borrowing the long-term loan, consumers can get "more" money now and repay "less" money in the long future. This research not only contributes to air pollution and borrowing literature but also provides insights to the loan companies. Understanding the role of air pollution on the consumer's choice of borrowing products can help loan companies predict consumer's borrowing and repayment behavior better and manage the risk better.

Presentation 2 **How Categorization Shapes The Probability Weighting Function**
Dan Schley[1], Hang-Yee Chan[2], Manissa Gunadi[3], **Alina Ferecatu**[4], [1]Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands; [2]University of Amsterdam, Amsterdam, Netherlands; [3]ESADE, Barcelona, Spain; [4]Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands. Contact: ferecatu@rsm.nl
Abstract: We have long assumed that nonlinearities in the probability weighting function (PWF) occurred only near probabilities of 0 and 1. This occurs because going from a 0% chance to a 1% chance feels like a large leap from "not happening" to "a chance." One potential interpretation is that these nonlinearities occur because 0 is categorically different from the middle of the probability space which is categorically different from 1. The current research applied a more fine-grained exploration of the probability space and identified additional categorical boundaries leading to non-linearities in PWF. Our primary studies use a modified laddering technique design developed by Wu & Gonzalez (1996). For example, participants in Study 1 were presented 12 gamble pairs from a set of 49 that ranged in probabilities from 0 to 1. For any gamble pair, there was a riskier option with a 1% chance of $20 and an X% chance of $5, and a safer option with an X+4% chance of $5. Because the gambles changed by a constant expected value, nonmonotonicity in preference for the riskier option across gamble pairs indicates nonlinearity in PWF. We defined gamble pairs that crossed categorical boundaries (i.e., left digit of X%) as those where the riskier option had, for example, a 1% chance of $20 and an 18% chance of $5 and the safer option had a 22% chance of $5. Results of a random-effect logistic regression found that gamble pairs that crossed categorical boundaries exhibited dips in preference for the riskier option $b=-0.32$, $z=-5.79$, $p < .0001$, indicating multiple points of nonlinearity in the PWF, in addition to 0 and 1. Additional studies using other probability contexts, certainty equivalents, and verbal labels (e.g., "unlikely" versus "toss-up") of uncertainty provide evidence that uncertainty is categorized more finely than just 0 and 1, and additional categorical boundaries produce more nonlinearities in PWF than previously thought. We conclude by augmenting the mathematical structure of Tversky & Kahneman's (1992) PWF to produce a new 2-parameter model of PWF that can parsimoniously account for our empirical findings.

Presentation 3 **How Does Peter Piper Pick A Package Of Pepper? Consumer Inattention To Package Size Changes**
Ian Meeker, Boston Unversity, Boston, MA
Abstract: For consumer packaged goods, firms can increase unit prices by decreasing package content, a practice known as package downsizing. Since consumers underuse information on package size, they may fail to notice size changes. This paper examines the consumer response to package downsizing in the black pepper industry. As black pepper is storable, consumers' size choices depends on their current inventory and their product preferences. Because of this, consumers are sensitive to size across products. However, consumers are insensitive to size changes. This differential sensitivity to size suggests that downsizing exploits consumer inattention.

Presentation **Session Chair**
Ian Meeker, Boston Unversity, Marlborough, MA

Thursday, June 11, 2020
Session "TB"
10:15 AM - 11:15 AM

TB01. Machine Learning, Artificial Intelligence, and Causal Inference in Marketing II

TB02. Digitization 3: Advertising & Branding

TB03. Game Theory: Media

TB04. Retailing and Market Structure

TB05. Measuring Advertising Effects II

TB06. Social Media and Engagement I

TB07. Choice Modeling I

TB08. Games and Gaming Platforms I

TB09. Gaining Consumer Insights Using Eye Movement and Biometrics Data

TB10. Internet of Things

TB11. Behavioral Modeling I

Session TB01 **Machine Learning, Artificial Intelligence, and Causal Inference in Marketing II**
01
10:15 AM - 11:15 AM

Presentation 1 **Predicting Restaurant Visits Using Mobile Location and Driving Data: A Machine Learning Approach**
Unnati Narang, Fernando Luco, Texas A&M University, College Station, TX
Abstract: Drivers in the U.S. record 3.22 trillion miles on the nation's roads every year. Despite the increasing driving miles among Americans, how marketers and businesses can benefit from learning driving behaviors and consumers' movement has not been examined thoroughly. The goal of this paper is to understand how consumers' driving patterns influence their demand for specific retail locations in the food services and restaurant industry. Specifically, (1) how do consumers' movement patterns impact their subsequent demand for retailers? (2) how should platforms (apps) offering locational intelligence price their services for participating businesses? We assemble data from multiple sources to answer these questions. First, we have large-scale high-frequency GPS car driving data for 50,000 individual drivers in Texas for 2019. Second, we also collect aggregate data on visits by location for all retail locations in Texas over the same time period. We use machine learning techniques and find that consumers' movement patterns have additional predictive power in identifying their future visits, contributing to additional retail spending. We discuss heterogeneity in these effects across consumers and businesses, and their implications for platform pricing and policy.

Presentation 2 **Designing Relational AI Bots in Healthcare Marketing**
Wenyu Jiao[1], Xueming Luo[2], Haizhong Wang[3], [1]Temple University, Philadelphia, France; [2]Temple University, Philadelphia, PA, [3]Fudan University, Shanghai, China.
Abstract: Despite the vast applications and bright visions of AI in healthcare, patients are still resistant to adopt AI. Our research context is AI chatbot for an online pharmacy. AI chatbot can remind patients to repurchase drugs, as well as provide medical and marketing information. A key challenge for medical AI chatbot, however, is how to alleviate the negative effects of AI disclosure. Our research aims to design an AI chatbot to solve this issue. We conduct a large scale field experiment with the large online pharmacy. The study is a 2×2 experiment. 5,000 patients are randomly assigns to into four AI chatbot designs: disclosed transactional AI, disclosed relational AI, undisclosed transactional AI and undisclosed relational AI. Our results show several key finding. First, the impact of the disclosure of AI machine identity is negatively moderated by a relational AI chatbot design. Second, the impact of the disclosure of AI machine identity is positively moderated by patients' privacy sensitivity. Third, the disclosed relational AI chatbot has a positive impact on healthcare engagement and purchases from the pharmaceutical company among privacy-sensitive patients.

Presentation 3 **Emojis as New Targeting Language: A Multimodal Emoji Mining Approach**
Xinying Hao[1], Vijay Mahajan[2], [1]University of Arizona, Tucson, AZ, [2]University of Texas, Austin, TX
Abstract: Emoji targeting has made its debut in marketing practice. In this paper, we develop a multimodal emoji mining approach, and we examine the incremental effect of using emojis in targeted messages. To overcome this technical challenge that no emoji-mining approach is currently available in the marketing literature, we propose a multimodal approach that combines both visual and textual information to predict suitable emojis. We use state-of-the-art computer vision and natural language processing tools to extract visual and textual features, and we design a two-stream deep network that fuses the information from both modalities to make a joint prediction. By training and testing this network on a large Twitter dataset, our results demonstrate that our method can successfully recommend the optimal emojis, and it outperforms a series of baselines. We validate our approach by investigating the incremental effect of emoji use on targeting outcomes (e.g. CTR) via lab and field experiments.

Presentation **Session Chair**
Xinying Hao, University of Arizona, Tucson, AZ

Session TB02 **Digitization 3: Advertising & Branding**
02
10:15 AM - 11:15 AM

Presentation 1 **Advertising Effects in Equilibrium**
Sarah Moshary, University of Pennsylvania, Philadelphia, PA
Abstract: Platforms face a tradeoff in determining the optimal amount of advertising: while selling advertising space generates revenue, it may also reduce the attractiveness of the platform to consumers, who may in turn exit. As an example, a newspaper must decide how to allocate column inches between advertisements and news stories. Similarly, a search engine must decide how and in what order to present sponsored and organic search results. In order to optimize advertising, these platforms must understand the cost of advertising - that is, how advertising changes consumer behavior. The chief challenge in estimating the effect of advertising is endogeneity. That is, a regression of churn on advertising volumes is confounded by advertisers' targeting policies. This paper exploits an experiment on a large e-commerce platform to estimate the causal effect of advertising on consumer behavior, seller revenue, and platform revenue. In the experiment, a random sample of users is shielded from advertising. The paper documents how advertising affects users in the short- and long- term, and it explores important dimensions of heterogeneity in these effects.

Presentation 2 **Attention-based Product Design**
Kosuke Uetake[1], Matthew Shum[2], Xiao Liu[3], [1]Yale School of Management, New Haven, CT, [2]California Institute of Technology, Pasadena, CA, [3]New York University, New York, NY
Abstract: This paper uses a unique individual-level data on the audience's attention to TV programs to study how TV program contents affect the viewer's attention. We model the viewer's preference to depend on anticipation, suspense, and surprise and estimate it with the data of the Japanese professional baseball games. Using the estimated model, we consider the design of baseball games by simulating the counterfactual attention when rules are changed.

Presentation 3 **Preference Formation in the Craft Beer Industry**
Bart Bronnenberg[1], Jean-Pierre Dube[2], Joonhwi Joo[3], [1]Tilburg University, Tilburg, Netherlands; [2]University of Chicago, Chicago, IL, [3]University of Texas at Dallas, Dallas, TX
Abstract: We study the formation of consumer preferences for craft brands in the U.S. beer industry. Empirically, this subcategory disproportionally appeals to the younger "Millenials" generations, causing industry experts to conclude that Millenial consumers are fundamentally different from earlier generations. We challenge this conventional wisdom and show that Millenials undergo the same underlying mechanism for brand preference formation as earlier generations. Changes in federal and state laws that coincided with the timing of Millenials reaching the legal age to drink alcohol dramatically lowered the barriers to entry in the beer industry, facilitating an influx of small, Craft brands. Consequently, Millenials faced different initial conditions as they began to form their beer brand capital, with considerably more variety in brands and beer types from which to choose. We exploit detailed, household panel data matched with a census of the Craft beer brands and their entry timing to test whether preference formation is truly different across generations. Alternatively, differences between generations merely reflect different initial conditions. Our findings suggest the latter. We find that the consumption capital for established brands deterred older generations from trying Craft brands when they launched. In contrast, Millenials, lacking brand capital at the time of launch, are more likely to purchase Craft brands and form a stronger preference for them. Using differences in state laws which moderate the timing of entry of craft brands, we also find that Millenials who reach legal drinking age before the influx of Craft brands in their market are less likely to form a strong Craft brand preference. Using mergers and acquisitions that cause Craft brands to grow in scale and cease to satisfy the stark criterion for "craft" status, we find that Millenial Craft brand preferences are genuine brand preferences, and not a taste for small, artisenal products per se. An implication of our study is that consumer preferences for sensory characteristics like fullness of flavor are not given but at least partially formed.

Presentation **Session Chair**
Bart Bronnenberg, Tilburg University, Tilburg, Netherlands

Session TB03 **Game Theory: Media**
03
10:15 AM - 11:15 AM

Presentation 1 **Off With Their Headers! Incentives And Transparency In Multi-layer Programmatic Advertising Auctions.**
Francesco Balocco[1], Yixin Lu[2], Ting Li[3], [1]Rotterdam School of Management - Erasmus University, Rotterdam, Netherlands; [2]George Washington University, Washington DC, DC, [3]Erasmus University, Rotterdam, Netherlands. Contact: balocco@rsm.nl
Abstract: Programmatic Media Buying (PMB) technologies are increasingly adopted in digital advertising. According to eMarketer, the estimated market coverage of PMB will reach 90% by the end of 2020. Historically, PMB-facilitated transactions relied on variants of the second-price sealed-bid auction. The predominant market mechanism to clear unsold impressions consisted of running sequential auctions on several partner Ad Exchanges. Recently, publishers started to offer their impressions in parallel to multiple Ad Exchanges, running an additional layer of first-price sealed-bid auction on top of the Ad Exchanges' mechanism to determine the winning bid. This new allocation mechanism, namely, Header Bidding (HB), promises higher revenues for publishers and better allocative efficiency for the whole market. In this paper, we develop an analytical model to investigate the effects of HB on the market. We show that, despite the apparent convenience of the new mechanism, HB may hurt Publishers' revenues. Specifically, the additional first-price sealed-bid auction layer may force Ad Exchanges to adopt first-price mechanisms internally to be able to stay competitive. Such shift may push Ad Exchanges to charge higher fees on the supply side, which in turn, would force publishers to raise their floor prices and discourage the participation of potential bidders. Our work contributes to a growing body of literature on PMB by taking a novel perspective on the taxation-like effects of Ad Exchanges' fees on the Publishers' revenues. Our findings provide useful implications to PMB market players by pinpointing the potential risks of the current mechanism shift towards multilayer auctions in PMB.

Presentation 2 **More Information Isn't Always Better: The Effects Of Informative Advertising Content On Consumer Search And Purchase**
Yun Wang[1], Cexun (Jeff) Cai[2], Yan Liu[1], [1]Texas A&M University, College Station, TX, [2]National University of Singapore, Singapore, Singapore. Contact: ywang@mays.tamu.edu
Abstract: At the start of a shopping journey, consumers often gain awareness about a new product through information presented via an advertisement. From a firm's standpoint, how informative should an advertisement be? Is a highly informative advertisement always necessarily better in guiding consumers through the marketing funnel as they carry out their search and purchase decisions? To address this question, we first set up a game-theoretic model in which consumers update their beliefs about product value by informative advertising content and then decide whether and which product(s) to search. As our model encompasses the microfoundations of a consumer's decision, we find an interplay of a firm's competitive strategy with regards to consumer's search cost, towards determining the optimal amount of information in an advertisement. This comes about because of the competing effects between aggregate market size and a firm's market share. To test our theory, we use the dynamic state space model to examine the effects of informative advertising content on consumer search and purchase in the context of the U.S automobile market using a unique data set containing 70 car models and 15729 advertising creatives from 2014 to 2018. Our preliminary empirical findings appear to lend support to our theoretical predictions. Hence, using a blend of theory and empirics, we demonstrate the nuances of a firm's decision on choosing the optimal amount of information to present in an advertisement.

Presentation 3 **A Dynamic Model Of Optimal Retargeting**
J. Miguel Villas-Boas, Jesse Yao, University of California, Berkeley, CA
Abstract: A consumer searching for information on a product may be indicative that the consumer has some interest in that product, but is still undecided about whether to purchase it.Some of this consumer search for information is not observable to firms, but some may be observable. Once a firm observes a consumer searching for information on its product, the firm may then want to try to provide further information about the product to that consumer, a phenomenon which has been known in electronic commerce as retargeting. Firms may not observe all activities by a consumer in searching for information, may not be able to observe the information gained by consumers, and may not be able to observe whether a consumer stopped searching for information. A consumer could stop searching either because he received information of poor fit with the product, or because he bought the product (which may be unobservable to the firm), or because he exogenously lost interest in the product. This paper presents a dynamic model with these features characterizing the optimal advertising retargeting strategy by the firm. We find that a forward-looking firm can advertise more or less than a myopic firm to gain more information about whether the consumer is searching for information. We characterize how the optimal advertising retargeting strategy is affected by the ability of the firm to observe when the consumer purchases the product, when the firm is better able to observe the consumer search behavior, and by the informativeness of the signal received by the consumer. We find that better tracking of consumer search behavior could be beneficial for consumers, because it may reduce the length of time when a consumer receives retargeting. Finally, we also study the value of retargeting, we investigate what happens if the firm is able to recognize when purchases occur, and we consider the consumer's optimal search behavior and its implications for pricing.

Presentation 4 **Social Sharing With Competition**
Yuanchen Su[1], Yi Zhu[1], Anthony Dukes[2], [1]University of Minnesota, Minneapolis, MN, [2]University of Southern California, Los Angeles, CA, Contact: suxxx374@umn.edu
Abstract: Marketers often encourage their customers to share their product experiences with their social contacts - social sharing. Such encouragement is based on the assumption that social sharing increases consumers' willingness-to-pay. However, this logic does not consider the impact of social sharing in the presence of competition. Because social sharing affects consumers' uncertainty about competitive options, it affects the intensity of price competition. This research examines the effect of social sharing on firms' competitive pricing strategy and profitability. We develop an analytical model to identify conditions under which positive social sharing may backfire and conditions under which firms can benefit from consumers' sharing. There are two generations of socially connected consumers who have correlated preferences. Consumers sequentially evaluate products from two firms before purchase. Each early adopter buys one of the products and

shares its match value with followers, who then update their beliefs. We find social sharing can have two counter-acting effects on competition. First, there is the mean shifting effect that sharing raises a follower's willingness-to-pay. Second, there is the variance diminishing effect that reduces a follower's perceived differentiation of the two products. The correlation of preferences between early adopters and followers has non-monotone effects on firms' equilibrium price and profits. Sharing positive information about a firm's product may hurt the firm when the correlation is strong.

Presentation **Session Chair**
Yuanchen Su, University of Minnesota, Minneapolis, MN

Session TB04 **Retailing and Market Structure**
04
10:15 AM - 11:15 AM

Presentation 1 **Optimal Retailer Pricing Strategies Under Consumer Cross-Category Incidence and Purchase Quantity Decisions**
Praveen K. Kopalle[1], Sri Devi Duvvuri[2], [1]Dartmouth College, Hanover, NH, [2]University of Washington, Bothel, WA
Abstract: The objective of this research is to determine pricing policies from a retailer's perspective by taking into consideration the dynamics of consumers' purchase behavior across categories. While research on category management focuses on developing pricing strategies within a category, our approach involves both within- and cross-category interactions. For the consumer demand model we estimate a Hierarchical Bayes econometric specification of multiple discreteness, which simultaneously accounts for purchase incidence and quantity decisions of consumers across multiple categories. The model will be estimated using Markov Chain Monte Carlo (MCMC) methods. Scanner data for different categories are used for estimation. Using the estimated parameters, we develop profit-maximizing dynamic pricing policies over time for the categories included in the analysis. The scanner data is provided by a stand-alone garden retailer in the Pacific Northwest Region. We also have survey data conducted for consumers on the same panel provided by retailer.

Presentation 2 **The Impact of Adding a Gas Station for Club Stores: Evidence from a Natural Experiment**
Aashish Pandey[1], Yu Ma[2], Dinesh Gauri[3], Kusum L. Ailawadi[4], [1]Sam Walton School of Business, Fayetteville, AR, [2]McGill University, 1001 rue Sherbrooke Ouest, QC, Canada; [3]University of Arkansas, Fayetteville, AR, [4]Tuck School of Business at Dartmouth College, Hanover, NH, Contact: APandey@walton.uark.edu
Abstract: Brick and mortar retailers have expanded in-store services like coffee shops, delis, banks, and gas stations to differentiate themselves, draw shoppers in, and keep them coming back. Because of their unique characteristics, different retail formats are likely to see varying impacts of such services. In this research, we study the impact on warehouse club stores of opening a gas station on the premises. Given its lower per unit prices for bulk purchases, the lower density of stores, and its membership model, the impact is likely to be quite different for this format versus others like traditional supermarkets. For example, a gas station may not be as effective in drawing people to the store since the average distance to a club store is significantly higher than to a supermarket, and there is a membership fee. However, if the lure of lower prices at the gas station does persuade a consumer to become a member or renew membership, the sunk cost of membership may imply a larger increase in purchases than at a supermarket. We make use of a natural experiment to quantify the effect of opening a gas station on store revenue. We then drill down further into the impact on new member acquisition, retention, store visits, and purchases to understand the mechanisms by which store revenue is affected. Our analysis also offers other insights, e.g., into shopping frequency, the types of shoppers attracted, and the coincidence of gas and non-gas purchases.

Presentation 3 **Technology and Market Structure: An Empirical Analysis of Entry and Exit in Retail Banking**
Bin Li[1], Hongju Liu[2], **Ting Zhu**[3], [1]Wright State University, Dayton, OH, [2]Peking University, Beijing, China; [3]Purdue University, West Lafayette, In
Abstract: Most U.S. banks started to offer Internet banking in late 1990s. Since then the retail banking industry has been expected to substitute the costly branch network with the far more cost-efficient Internet channel. However, we find that the expansion of online banking did not reduce the total number of brick-and-mortar branches, and furthermore, large, national banks expanded their branch network at the cost of small, local banks. Using detailed data on branch location and performance, we estimate a dynamic entry/exit model to investigate the relationship between the technology advancement and the market structure evolution. Our findings suggest that the advent of online banking has provided significant competitive advantages to large banks over small banks. Specifically, large banks are in a better position to take advantage of the increasing residential broadband penetration rate by investing more in online banking services, and hence improve efficiency and reduce the costs in operating offline branches. Our model can disentangle how different factors contribute to the market structure evolution. Through counterfactual simulations, we show that the reduction in operating costs for large banks is the most significant factor in driving the evolution of the U.S. banking industry, followed by higher entry costs and higher deposits due to greater online presence.

Presentation 4 **Identifying Competitors in Geographic Markets Using Spatial Models**
Xian Gu[1,2], **Pallassana K. Kannan**[3], [1]College Park, MD, [2]Indiana University, Bloomington, IN, [3]University of Maryland-College Park, MD
Abstract: Identifying the most relevant competitors in a geographic market is one of most important problems for any retailer or hotel property with an offline presence. While the competitive market structure may depend on the features of the market and the characteristics of the business, the business's geographic location as well as its distance from other businesses are two important factors impacting local competition. Leveraging a rich dataset of multiple U.S. hotel markets, we investigate the hotel competitive structure across different customer segments by accounting for geographic location, time, pricing, and property characteristics. We study not only the metropolitan regions with hundreds of hotel properties located within a limited area but also the rural regions with sparse distribution of hotel properties. In particular, our data consist of daily information from 2,320 hotel properties in seven U.S. markets over a one-year period in 2016. We use a variant of the iterative sure independence screening (ISIS) method and the spatial seemingly unrelated regression model to construct the competitor sets as well as estimate the system of demand equations. Additionally, we compare the competitive market structures in dense markets and sparse markets and find interesting patterns. In addition, we find that the market structure may also vary across different customer segments. For example, two hotels can be competitors for customers of the regular transient segment, but they may not compete for customers using online travel agencies.

Presentation **Session Chair**
Pallassana K. Kannan, University of Maryland-College Park, College Park, MD

Session TB05 **Measuring Advertising Effects II**
05
10:15 AM - 11:15 AM

Presentation 1 **Search Advertising and Information Discovery: Are Consumers Averse to Sponsored Messages?**
Navdeep S. Sahni, Stanford, Stanford, CA
Abstract: We analyze a large-scale field experiment conducted on a US search engine in which 3.3 million users were randomized into seeing more, or less prominent advertising. Our data rejects that users are, overall, averse to search advertising targeted to them. At the margin, users prefer the search engine with higher level of advertising. The usage of the search engine (in terms of number of searches, and number of sessions) is higher among users who see higher levels of advertising, relative to the control group. This difference in usage persists even after the experimental treatment ends. The increase in usage is larger for users on the margin who, in the past, typed a competing search engine's name in the search query and navigated away from our focal search engine. On the supply side, higher level of advertising increases traffic to newer websites. Consumers also respond more positively to advertising when local businesses in their state create new websites. Quantitatively, the experimental treatment of a higher level of advertising increases ad clicks which leads to between 4.3% to 14.6% increase in search engine revenue.Taken together, patterns in our data are consistent with an equilibrium in which advertising compensates for important information gaps in organic listings: it conveys relevant new information, which is unknown to the search engine, and therefore missed by the organic listings algorithm. Viewing search ads, at the margin we study, makes consumers better off on average.

Presentation 2 **Persistent Local Channel Viewership and the Causal Effect of Advertising on Demand for Consumer Goods**
Andrey Simonov, Columbia University, New York, NY
Abstract: We exploit the persistent differences in zip code-level channel viewership in the US and exogenous shifters of the viewership to study the causal effect of advertising on demand and profitability. We document that channel viewership has substantial and persistent differences across the zip codes, even when zooming in on the zip codes in the same Designated Market Areas (DMAs). The differences in viewership are moderated by the numeric channel position of a network. Such persistent viewership differences create weekly sets of natural experiments, with some locations being more exposed to brands' advertising as brands shift their ad spending from channel to channel over time. The identification strategy leverages these natural experiments to estimate the causal effect of advertising. Our analysis relies on a novel combination of various consumer packaged goods databases.

Presentation 3 **Principal Stratification for Advertising Experiments**
Ron Berman[1], Elea McDonnell Feit[2], [1]The Wharton School, Philadelphia, PA, [2]Drexel University, Philadelphia, PA
Abstract: Advertising experiments often suffer from noisy responses making precise estimation of the average treatment effect (ATE) and evaluating ROI difficult. We develop a principal stratification model that improves the precision of the ATE by dividing the customers into three strata -- those who buy regardless of ad exposure, those who buy only if exposed to ads and those who do not buy regardless. The method decreases the variance of the ATE by separating out the typically large share of customers who never buy and therefore have individual treatment effects that are exactly zero. Applying the procedure to 5 catalog mailing experiments with sample sizes around 140,000 shows a reduction of 36-57% in the variance of the estimate. When we include pre-randomization covariates that predict stratum membership, we find that estimates of customers' past response to similar advertising are a good predictor of stratum membership, even if such estimates are biased because past advertising was targeted. Customers who have not purchased recently are also more likely to be in the "never purchase" stratum. We provide simple summary statistics that firms can compute from their own experiment data to determine if the procedure is expected to be beneficial before applying it.

Presentation **Session Chair**
Elea McDonnell Feit, Drexel University, Philadelphia, PA

Presentation **Session Co-Chair**
Ron Berman, The Wharton School, Philadelphia, PA

Session TB06 **Social Media and Engagement I**
06
10:15 AM - 11:15 AM

Presentation 1 **Strategic Opacity In Crowdsourced Quality Evaluation Policies**
Linli Xu[1], Gordon Burtch[2], **Qi Xie**[3], Li Wang[4], [1]University of Minnesota, Minneapolis, MN, [2]University of Minnesota, Minneapolis, MN, [3]University of Minnesota, Minneapolis, MN, [4]Shufe, Shanghai, China. Contact: xie00080@umn.edu
Abstract: Scalable evaluation of crowdsourced creative submissions tends to take the form of a crowd-voting mechanism. Unfortunately, crowd-based majority voting mechanisms suffer from a number of issues, most notably manipulation. The manipulation of crowd-voting mechanisms is problematic because prior studies have demonstrated that crowd submitters seek to learn from their own performance and that of peers, which is only possible if the feedback is informative about quality. In this work, we consider approaches to mitigating manipulation in crowd evaluations, paying particular attention to the role of strategic opacity. The returns to investment in manipulation are readily discernible when evaluation rules are transparent. Prior work has argued and demonstrated that strategic opacity, i.e., purposefully concealing the complete set of inputs or input-weights used to determine performance evaluations, can be an effective means of mitigating agents' interest in gaming, because the opacity introduces risk for agents, e.g., investment in manipulation might be wasted, or could even backfire. We explore this tension in the context of Threadless.com, one of the best-known examples of online crowdsourcing for creative content. We undertake a pair of event studies, wherein the platform operator initially introduced a submission filtering mechanism that transparently eliminated submissions from consideration that failed to achieve an average rating above 1.5 after a short period of time. Subsequently, however, Threadless altered the filtering mechanism to make its conditions opaque. We first provide evidence that the initial policy change resulted in strategic gaming on the part of many designers. With the introduction of the opaque policy, gaming effectively reduced. Considering the impact of each policy had on the average quality of submissions, we show that the opaque policy resulted in significant improvements, whereas the former did not. We discuss the implications for the design of crowd-evaluation mechanisms, and possible avenues for future work.

Presentation 2 **The Effect Of Non-reciprocal Behavior On Community Participation: The Threat Of Inactive Members For Online Brand Communities**
Jeroen van den Ochtend[1], Jacob Goldenberg[2], Rene Algesheimer[3], [1]University of Zurich, Zurich, Switzerland; [2]Interdisciplinary Center (IDC) Herzliya, Herzliya, Israel; [3]University of Zurich, Zurich, Switzerland.
Abstract: Although online brand communities typically show a continuous growth in members, naturally a large share of members are inactive. As activity levels are rarely communicated, it is possible that active members target inactive members with networking initiatives or information requests. Building on social capital theory, we argue that the absence of a reciprocal response from inactive members negatively impacts the community participation of active members. To test our hypotheses, we analyze a platform initiated by a brand for cooking devices on which 244'000 members participate through creating, sharing, and rating over 67'900 recipes. In addition, members interact through friend networks, personal messages, forums, and recipe related questions. We identify more than 30'000 members who targeted a total of 30'600 questions, 17'200 personal messages, and 20'700 friend requests at inactive members. We apply a Prentice, Williams and Peterson (PWP) model to estimate the effect of non-reciprocal behavior from inactive members on the repeated community participation of active members. The results show that non-responsiveness of inactive members to personal messages, friend requests, and recipe specific questions significantly reduce the likelihood that initiators will continue to participate. A comparison across three countries shows that the negative effects of a non-response are structurally larger than the positive effects of reciprocity and can reduce the probability of subsequent participation by as much as 35%. These results contribute to the theoretical understanding of non-reciprocal behavior in online brand communities. In addition, the results highlight the importance of reducing the probability that active members target inactive members with networking initiatives or information requests.

Presentation 3 **Brands On Social Media:a Meta-synthesis On The Social Media Value Chain**
Georgia Liadeli[1], Francesca Sotgiu[2], Peeter W. J. Verlegh[2], [1]Vrije Universiteit Amsterdam, Amsterdam, Netherlands; [2]Vrije Universiteit Amsterdam, Amsterdam, Netherlands.
Abstract: With more than three billion social media users worldwide, brands have long recognized the potential of social media to generate strong marketing outcomes, such as brand image and sales (Moorman 2018). Many brands have established an active social media presence, across a multitude of channels, including Facebook, Instagram, Twitter, YouTube, and brand-related blogs. The brand-initiated content shared through these channels aims to influence brand image and consumer behavior, either directly or indirectly, by stimulating "earned social media" (i.e., brand-related content generated by third parties, including consumers; Stephen and Galak 2012). Yet companies often question the actual return of their social media presence. Specifically, to what extent does it stimulate *earned social media*? More important, does it improve brand image, purchase intentions, and sales? However, research has only explored separately the links from brand's owned social media to earned social media, brand image, and consumer buying behavior. To address this issue, we introduce the social media value chain providing a holistic assessment, whereby owned social media affects earned social media and brand image, which, in turn, impact consumer buying behavior. We conduct a three-step meta-analysis, which encompasses more than 2500 effects collected across 225 papers spanning from 2004 to 2019, covering 40 platforms, 15 industries, and 61 countries. The results show that at the start of the value chain owned social media affects earned social media, and together they influence brand image. Earned social media has an effect on consumer buying behavior while the impact of owned social media on consumer buying behavior is established only through chain effects. Finally, consumer buying behavior is primarily influenced by brand image. Interestingly, these effects are dependent on platform-industry-country combinations. For example, a brand's image benefits more from social media activities in digitally and economically advanced countries.

Presentation 4 **Does The Aesthetic Quality Of Product Photos Affect Online Consumer Response? An Empirical Investigation Of The Role Of Depth Of Field**

Purushottam Papatla[1], Nima Y. Jalali[2], [1]University of Wisconsin-Milwaukee, Milwaukee, WI, [2]University of North Carolina - Charlotte, Charlotte, NC, Contact: papatla@uwm.edu

Abstract: Photos posted by consumers on social media like Instagram often include brand and product imagery. Online retailers therefore repost them on their websites to stimulate product interest and increase visits to product pages by website visitors. Despite the substantial increase in consumer postings and their use by brands, there have been few empirical investigations into the role of the photos' aesthetic quality on how prospective consumers respond to them. We begin to address this issue in our research by investigating how the number of visits by online retail visitors to the pages of the products in the posted photos is related to the *depth of field* of different areas of the photos. Reductions in the depth of field of specific areas of the photos are often used by photographers to make the other areas more blurred and bring the selected areas into greater focus as a means of attracting the viewers' attention to those areas. Consequently, photos with at least some areas with a low depth of field become easier to process and are judged to be more aesthetically pleasing by viewers (Datta et al 2006). Data for our investigation comes from monitoring visits to the pages of products in photos posted by people on Instagram and curated on their sites by several online retailers. We present the findings from our investigation as well as directions for future research into the role of other aspects of photo aesthetics in consumer response in online retail settings.

Presentation **Session Chair**

Purushottam Papatla, University of Wisconsin-Milwaukee, Milwaukee, WI

Session TB07 **Choice Modeling I**
07
10:15 AM - 11:15 AM

Presentation 1 **Non-parametric Estimation Of Brand Loyalty**
Jean-Pierre H. Dube[1], Oeystein Daljord[1], Xinyao Kong[2], [1]University of Chicago, Chicago, IL, [2]University of Chicago Booth School of Business, Chicago, IL, Contact: jdube@chicagobooth.edu
Abstract: Persistence in brand choice is pervasive in consumer packaged goods industries. The decomposition of the observed persistence into state dependence and unobserved heterogeneity comprises a classic econometric problem marketing with implications for the measurement of brand loyalty. The formal identification of choice models with brand loyalty remains an open question since the extant literature has relied on ad hoc parametric assumptions. A recent exception is Torgovitsky (2019), who formulates a non-parametric dynamic potential outcomes model that set identifies state dependence using economically motivated assumptions and is robust to the initial conditions problem. We apply the model to test for state dependence in brand purchases and to quantify the extent of brand loyalty subject only to mild microeconomic identifying assumptions. We compare the sensitivity of our estimates to those from a standard, parametric dynamic model to assess the implications of the ad hoc assumptions. Finally, we explore the implications of our non-parametric estimates of brand loyalty for pricing policies.

Presentation 2 **Contributed Paper**
Sriharsha Kamatham[1], B.P.S. Murthi[2], [1]UT Dallas, Richardson, TX, [2]University of Texas- Dallas, Richardson, TX
Abstract: We propose a new framework for operationalizing the multiple discrete-continuous class of choice models. By relaxing the full information axiom of traditional discrete choice models, we integrate two streams of literature: 1) multiple-discrete continuous (MDC) choice models and 2) context-dependent consideration sets. This proposed model works in two stages. The first stage consists of consideration set formation and the second stage where consumers make the actual choice. For the first stage, we use two different methods to infer consideration sets using consumer choices. In the first method, we use prior consumption choices to infer the consumer's consideration sets by the time of the day. In the second method, we using a machine learning algorithm called XGBOOST to predict choices that are part of the consideration sets. We then enumerate over these predicted choices, thus reducing the set of potential consideration sets that we need to go over. Unlike traditional methods of estimation using consideration sets inferred from consumer surveys, we estimate the consideration sets based on consumer's characteristics, consumption context, and product characteristics, thus achieving a very high predictive performance. Using unique individual-level panel data of snacking, we estimate the model using the information on individual characteristics, product characteristics and time of consumption. The model is then tested by comparing it against a 1-stage model with and without random intercepts. We show that the 2-stage model has a better fit than the original specification with and without random intercepts. The results we obtain are consistent with prior research on the need for including consideration sets in discrete choice models. We discuss implications for managers who are interested in selling optimal consumption bundles and for policymakers who are interested in addressing obesity issues or over-consumption among the consumers.

Presentation 3 **Implications Of Ignoring The Budget Constraint In Menu-based Choice**
Tetyana Kosyakova[1], Thomas Otter[2], [1]Frankfurt School of Finance & Management, Frankfurt, Germany; [2]Goethe University Frankfurt, Frankfurt, Germany.
Abstract: It is common practice to assume quasi-linear utility in choice models of single-unit demand. Under the assumption that all inside prices are covered by consumers' budgets, budgets cancel from choice probabilities. In menu-based choice, the ultimate choice consists of some combination of menu items and a quasi-linear utility model implies that consumers' budgets, in principle, cover the joint purchase of all items in a menu. This implicit assumption is almost surely violated in large menus that may comprise, at least some, more expensive items. In this paper, we generalize the recently proposed menu choice model (Kosyakova et al., 2020) to account for budgets that may constrain consumers' feasible choice sets. Our results show that ignoring budget constraints results in systematically biased inference for marginal direct utilities, price-sensitivity, as well as demand interactions, i.e., substitution and complementarity patterns between menu items. We find that the bias increases in the menu size and discuss implications for modeling demand from larger menus.

Presentation 4 **A Heuristic Search Model For Discrete Demand**
Sanghak Lee, Sunghoon Kim, Sungho Park, Arizona State University, Tempe, AZ, Contact: sanghak.lee@asu.edu
Abstract: This paper develops a heuristic search model for discrete demand and its estimation technique. We question the underlying assumptions of economic choice models based on constrained optimization and propose an alternative decision-making process where a consumer makes a series of one unit purchase decisions, which leads to a shopping basket with multiple quantities of various products. The proposed model has several advantages over the existing models. First, it is built on the indivisibility of data, which enables us to avoid biases in parameter estimation and policy implications caused by ignoring data discreteness (Lee and Allenby, 2014). Second, it is more flexible in incorporating various types of utility specifications and constraints since it does not require the global concavity of an objective function. Third, its estimation is less computationally burdensome com- pared to the error augmentation method in Lee and Allenby (2014), and thus it can be applied to various contexts in a more practical manner.

Presentation **Session Chair**
Sanghak Lee, Arizona State University, Tempe, AZ

Session TB08 **Games and Gaming Platforms I**
08
10:15 AM - 11:15 AM

Presentation 1 **Horizontal And Vertical Software Multihoming On Entertainment Platforms**
Nico Wiegand[1], Yuri Peers[1], **Alexander Bleier**[2], [1]Vrije Universiteit Amsterdam, Amsterdam, Netherlands; [2]Frankfurt School of Finance & Management, Frankfurt am Main, Germany. Contact: a.bleier@fs.de
Abstract: In video gaming, a classical digital platform market, console sales depend on a steady supply of fresh and enticing games. To obtain a competitive advantage, console manufacturers often pursue contracts that allow software developers to exclusively release specific games for their console. However, developers often follow a multihoming strategy according to which they release games for multiple platforms. In recent years, two distinct multihoming strategies have emerged. First, following a horizontal multihoming strategy, software developers may release a game for any number of directly competing consoles in the market. Second, following a vertical multihoming strategy, they may release a game not only for one specific current-generation console, but also for indirect competitors like mobile devices, handheld devices, or consoles from the prior generation. In this research, we draw on an extensive dataset of monthly hardware sales and over 8,800 software introductions in the seventh and eighth console generations (2005-2017), supplemented with information about software characteristics and corresponding advertising efforts to investigate the effects of horizontal and vertical multihoming on the total sales and market share of the three leading consoles, PlayStation, Xbox, and Wii. To this end, we employ an error correction modelling approach and a market share attraction estimation. Our results provide insights into the extent to which different types of software multihoming help or hurt hardware sales of console manufacturers and thereby influence their competitiveness in the short and long term.

Presentation 2 **A Dynamic Cross Classified Joint Modeling Framework For Large-scale Prediction Of Player Responses In Modern Multiplayer Games**
Trambak Banerjee[1], Hai Che[2], Shantanu Dutta[1], Peng Liu[3], Gourab Mukherjee[1], [1]University of Southern California, Los Angeles, CA, [2]University of California, Riverside, Riverside, CA, [3]Santa Clara University, Santa Clara, CA
Abstract: Multiplayer gaming platforms are increasingly reshaping the recreational and socialization aspects of modern life. With a personalized gaming experience at the core of these platforms, managers usually rely on predictions of key player responses to design timely interventions for promoting, engaging and monetizing their playing base. However, the longitudinal data associated with these games often exhibit several distinctive characteristics that pose significant challenges in developing flexible statistical algorithms that can generate efficient predictions of future player activity. For instance, the existence of friendship networks or 'guilds' in these games complicate prediction since players do not play as independent entities and the guilds themselves evolve over time thus casting a dynamic effect on future player activity and engagement. In this paper, we develop a Dynamic Cross Classified Joint Modeling framework for simultaneous prediction of correlated player responses. For analyzing such large-scale data, our framework conducts simultaneous, coordinated selection of fixed and random effects in high-dimensional penalized multivariate mixed models. Contrary to existing methods that assume player independence, the proposed framework is flexible enough to incorporate both temporal and cross-sectional player dependence as well as time varying guild effects on their future playing activity. Moreover, our framework can accommodate several practical considerations such as managerial insights on playing behavior through structural constraints on the model parameters. On a large-scale data from a popular multiplayer role playing game, the proposed framework conducts superior prediction of several correlated player responses. Consequently, platform managers can use these predictions for designing relevant marketing promotions that better match the predicted player responses in different business segments and thus increase the efficiency of their marketing campaigns.

Presentation 3 **Adding Thumbs (mobile) To Clicks (online): The Effects Of Adding A Portable Game System To An Existing Online Game**
Wooyong Jo, Mike Lewis, Emory University, Atlanta, GA, Contact: wjo4@emory.edu
Abstract: Recent developments in mobile technology have created new opportunities for video game producers to provide increased playing opportunities for customers. In particular, mobile devices such as the Nintendo Switch provide opportunities for consumers to play games even when they do not have access to consoles and computers. However, it is an outstanding question as to the advisability of this type of channel expansion strategy since little is known regarding how providing mobile gaming increases customer engagement in terms of playing and spending. In this study, we identify the effect of mobile channel addition on players' in-game usage and purchases using a dataset from the U.S. game publisher. Specifically, we treat the release of a mobile console game app for an existing online game title as a quasi-natural experiment. We find that the addition of the mobile channel grows overall game usage by 31%. However, we also find that the mobile channel acts as a substitute for the online channel as online usage drops by 7.5%. In terms of purchases, we observe a complementary effect as mobile channel addition results in increased purchases from both online and mobile channels (+3.5%) but the purchases through online channel remains intact. Additional analyses show that gamers who adopt the mobile channel experience reduced churn and play the game in more diversified hours of day. Our findings provide insights relevant to channel and customer management in the gaming industry.

Presentation 4 **The Effects Of Permutation And Fixed Anchors On Risk Aversion**
Haoyu Liu, Lifeng Yang, ShanghaiTech University, Shanghai, China.
Abstract: In this research, we show that consumers can be made more risk seeking in a win-more-or-lose-all game such as a most popular TV show called the Wo Wants to Be A Millionaire (Jame 2019). To encourage consumers to be more risk seeking, it is not rare to see that companies would implement certain win-more-or-lose-all guidelines to incentivize consumers to keep spend more or to lose the loyalty status if they do not. According to the expected utility theory (Hartley et al. 2013, Post et al. 2008), people's risk preference on choices are often associated with rational statistical expectations. Our current research offers a new evaluation of the assumption that consumers are rational enough to learn where they would receive the highest payoff in the win-more-or-lose-all game. Specifically, we study how permutation of a given leveling up system affects individual's risk seeking tendency. Imagine participants' risk seeking tendencies were measured by when they chose to quit a win-more-or-lose-all game that consists of either ten levels. We propose that permutation and labels of a leveling up system levels can interactively affect one's perception of an objective risk perspective, thus affect one's decision to continue seeking risk in a system.

We propose that one's perception of risk in a permutation system is affected by the ending label of the permutation. An ending label is perceived as fixed unsurpassable anchor of a permutation (i.e. "A" in an alphabetical sequence) imposes a higher risk signaling effect on one's risk perception (than if letters other than "A" be the ending label of a permutation). than labels that were less frequently conceptualized as an anchoring label in a sequence. With familiarity of the labeling system being controlled for, two studies were conducted to empirically test this conceptualization. Results of both studies showed that participants perceive a leveling-up system that start with a conceptually anchoring label be more risky than if the leveling-up system ends with a conceptually finite label.

Presentation **Session Chair**
Haoyu Liu, ShanghaiTech University, Shanghai, China.

Session TB09 **Gaining Consumer Insights Using Eye Movement and Biometrics Data**
09
10:15 AM - 11:15 AM

Presentation 1 **How Attention Reveals Why Consumers Choose What When**
Ana Martinovici[1], Rik Pieters[2], Ralf Van der Lans[3], [1]Erasmus University, Rotterdam, Netherlands; [2]Tilburg University, Tilburg, Netherlands; [3]Hong Kong University of Science & Technology-HKUST, Kowloon, Hong Kong.
Abstract: Consumers frequently make brand choices online after inspecting multiple alternatives. Hence, by the time consumers purchase a brand, they have made numerous other choices: what information to inspect, for which alternatives, for how long, and at what moments. All these choices reflect how consumers allocate attention between the different brands and attributes over time. In this paper, we develop a model that provides insights into how consumers decide (1) what brand to choose and (2) the moment when to express their choice, and (3) how these decisions are linked to the sequential eye movements that precede them. The model specifies that consumers use eye movements to inspect the brands on display until choosing one of them justifies foregoing the net benefits of additional information. The model is calibrated on eyetracking and choice data from a study (N = 214) on single choice between four digital cameras for which information is displayed side-by-side. The model generalizes earlier attentional driftdiffusion models (aDDMs) (Krajbich, Armel, and Rangel 2010) and sequential sampling models in cognitive psychology (Busemeyer and Townsend 1993), and recent work in economics and marketing (Krajbich and Rangel 2011; Reutskaja et al. 2011). It treats eye-movements as manifest indicators of latent information acquisition and utility accumulation processes and identifies early signs of the final brand choice from these. Importantly, and novel, the proposed model predicts when consumers are going to express their choice, in addition to what brand they choose, from moment-to-moment, for new consumers. This has implications for decision theory, online retailing, and potentially for dynamic recommender systems.

Presentation 2 **Prior Information and Consumer Search: Evidence from Eye-tracking**
Qianyun Zhang, Raluca M. Ursu, Tulin Erdem, New York University, New York, NY
Abstract: In many markets, consumers lack perfect information about all available options or their features before making a purchase decision. To understand consumer behavior in such markets, previous work has proposed models of consumer search, where consumers trade off the benefit against the cost of additional information and may therefore not acquire all the information available. Although rich, most of this literature has thus far focused solely on the role of consumer preferences and search cost in guiding search and purchase decisions. However, information acquired prior to beginning a current search, for example, that acquired through past purchases or uses of a given product, may also affect consumer decisions. In this paper, we develop a model of sequential search that additionally incorporates the impact of prior information on consumer search and purchase decisions. We estimate this model on a data set of consumers making smartphone search and purchase decisions. Our data set has two novel features: (i) it contains information on consumers' prior ownership of and experience with the products; and (ii) it captures search behavior at the very granular level of eye-movements. Preliminary evidence from our data demonstrates the importance of prior information: the more familiar consumers are with a product, the more likely they are to search and purchase it. Using these data, we then quantify the impact of prior information, in addition to consumer preferences and search cost, as well as document the estimation bias arising from omitting prior information from the model. These results highlight the role of prior information in the consumer search process. As such, they may provide managers with additional insights when designing the environment in which consumers search to account for both consumers' prior knowledge and current product information.

Presentation 3 *****Withdrawn***How Shared Consumption Enhances Enjoyable Experiences**
Eunsoo Kim[1], **Anocha Aribarg**[2], Natasha Zhang Foutz[3], [1]Nanyang Technological University, Singapore, Singapore; [2]University of Michigan, Ann Arbor, MI, [3]University of Virginia, Charlottesville, VA
Abstract: Shared experiential consumption, such as shared sports viewing, dining, and shopping, is ubiquitous and plays an important role in consumers' well-being. Previous research (Ratner and Hamilton 2015) has shown that consumers prefer sharing publically consumed experiences with friends and family. Nonetheless, the literature has largely focused on solo experiences and prior research on shared experience rely on self-report, albeit moment-to-moment, measures of experience (e.g., Ramanathan and McGill 2007). We thus currently do not have clear understanding how shared consumption contributes to experience. To address this research gap, our study aims at examining how consumers emotionally respond moment-to-moment to solo vs. shared experiential consumption and link the patterns of these moment-to-moment responses to consumers' retrospective overall evaluations of the entire experience. Instead of self-report measures, we rely on Galvanic Skin Response (GSR) to measure moment-to-moment arousal and facial EMG—capturing zygomaticus major and corrugator supercilli muscle activities—to control for emotional valence. Our goal is to use physiological mechanisms to explain whether and how shared vs. solo consumption enhances experiences. We further examine how two key characteristics of shared consumption— relationship distance (friends versus strangers) and social interaction (presence vs. absence) may moderate the effect. We hypothesize that shared consumption between friends, as compared to solo consumption, enhances experience by sustaining the arousal trend. We then explore to what extent arousal sustainability is attributable to mere presence of a consumption partner or social interaction. According to the hedonic adaptation literature (Nelson and Meyvis 2008; Nelson, Meyvis, and Galak 2009), we predict that social interaction plays a more important role in sustaining the arousal trend than mere presence of a consumption partner. In contrasting shared consumption between friends vs. between strangers, we additionally aim to investigate how sustained arousal alone may not be sufficient to predict retrospective evaluation of experience. Shared consumption with strangers may help sustain arousal but via the mechanism of induced anxiety. It is thus important to control for emotional valence (more positive for friends and less positive more strangers) in studying the importance of sustained arousal. In addition to the arousal trend, our study also explore other patterns of moment-to-moment emotional responses to experience documented by previous literature, such as, peak and end experiences.

Presentation 4 **Complementary Roles of Heart Rate and Galvanic Skin Response in Measuring Emotions and Memory: Implications for Marketing**

Vinod Venkataraman[1], Davide Baldo[2], Ornella Godard[2], Rich Timpone[2], [1]Temple University, Philadelphia, PA, [2]Global Science Organization, Philadelphia, PA

Abstract: Despite the growing popularity of neuroscience-based measurements in marketing, the effectiveness and the complementaity of the different methods remains unclear. Here, we focus specifically on two scalable physiological measurements: galvanic skin response (GSR) and heart rate (HR) and seek to elucidate their complementary roles in measuring cognition and emotions. A total of 93 participants participated in a lab study conducted in NYC. We recorded HR and GSR data in addition to self-report measures and EEG, as they were exposed to an in-house ground-truth emotional dataset consisting of 49 images, 16 videos, and 20 TV advertisements. These stimuli were chosen and validated independently to span a broad range of valence and arousal ratings. We also obtained an independent commercial effectiveness index (CEI) for the TV ads in the database. The experiment was divided into three blocks - TV ads, images, and videos. Within each block, all stimuli were randomized across participants. Respondents rated each stimulus on valence and arousal. Participants also completed 26 trials of a gambling task aimed at inducing different levels of valence (win, lose) and arousal ($1 vs. $3). At the end of the experimental session, participants completed a surprise recognition task where they were presented with 40 ad frames (2 from each TV ad) mixed with 20 matched foils. We found that interbeat interval (IBI, a measure of HR) was larger (slower heart beat) for negative than positive images, negative than positive videos as well as losses than gains in the gambling task. On the other hand, GSR was a significant predictor of arousal across images and videos. We also found that HR at encoding of TV ads was a significant predictor of recognition at both the ad level and at the corresponding frame level. Finally, we also found that HR was a significant predictor of CEI. In addition to validating the role of GSR in measuring arousal, our findings show that HR can discriminate emotional stimuli based on valence. Critically, HR provides an effective index of strength of memory encoding, which may in turn explain its ability to predict ad effectiveness. Beyond marketing, the complementary nature of these measures can provide valuable insights into the dynamics of adaptive decision making in other domains.

Presentation **Session Chair**

Anocha Aribarg, University of Michigan, Ann Arbor, MI

Session TB10 **Internet of Things**
10
10:15 AM - 11:15 AM

Presentation 1 **Influence Of Communication Styles In Physician-patient Interactions: Do Patients Respond Differently To Humans Versus Smart Agents?**
Hari Ravella, Deepankar Chakravarti, Virginia Tech, Blacksburg, VA, Contact: ravella@vt.edu
Abstract: The literature on consumer Internet of Things (IoT) suggests that a new generation of smart devices with human-like features and communication capabilities may play a key role in supporting shared decision making in physician-patient interactions. Contemporary healthcare service delivery models promote "shared decision making," where physicians and patients make decisions together.IN this context, a patient interacting with a smart agent emulating a human physician may assess different cognitive capabilities (knowledge and expertise), attribute different motivations, and make different socio-cultural appraisals than when they interact with the physician in-person. Our research examines whether communication style (empathetic versus impassive) implemented via facial expression and vocal delivery elicits different patient response when interacting with a smart agent (a physician' avatar) versus the physician in person. We report two studies examining these issues in the context of early stage breast cancer treatment. In study 1, we develop a benchmark interaction between a human physician and a human patient, We manipulate the oncologist's communication style to be *empathetic*/*impassive*. A trained human actor plays the oncologist. In Study 2, we repeat this procedure using two analogous interactions between a smart-agent physician and the human patient. The avatar was generated using software that mimics the human actor. In each study, a sample of adult female participants evaluates the videos in observer roles. We focus on how the communication style manipulation influences patient persuasion and the evolution of mediational measures (e.g., trust, satisfaction, liking, etc.) over a three phased interaction. We compare the results of studies 1 and 2 for insights into how smart agents may be used to support physician-patient interactions and how communication style designed into smart agents may influence patient persuasion and receptivity to such smart devices.

Presentation 2 **Quantifying Assemblage Theory to Reify the Possibility Space of Personal Automation Practices**
Thomas Novak, Donna Hoffman, George Washington University, Washington, DC
Abstract: The consumer Internet of Things (IoT) connects everyday objects to the Internet. The fundamental value proposition of the IoT is that consumers should be able to connect every smart object to every other smart object and digital service to better automate their lives. The web service IFTTT ("If This Then That") allows consumers to create such automation assemblages, called applets. In the first five years that IFTTT was used, consumers created 20,675 unique applets, out of nearly one million potential applets that could have been created. These realized applets are correspond to different types of automation practices. Each of the realized assemblages emerged as one of a population from an underlying topological possibility space (DeLanda 2006). In this possibility space, points of attraction guide the recurrent processes by which assemblages are formed and structured (DeLanda 2006, 2016). Points of attraction lead to the formation of assemblages corresponding to different automation practices. We use a computational approach, guided by these assemblage theory concepts, to understand what smart devices, services, and systems consumers connect together to automate their lives. Our approach uses word embeddings (word2vec, Mikolov 2013a; Mikolov 2013b) to quantify text representations of IFTTT applets, density-based clustering (HDBSCAN, Campello, Moulavi, and Sander 2013; McInnes, Heraly and Astels, 2017) to learn the automation practices, and non-linear dimensionality reduction (UMAP, McInnes, Healy, and James Melville, 2018) to represent applets and practices in an underling possibility space. Results show that the 127 personal automation practices we uncover can be explained by four temporally ordered higher processes involving social identity, social connectedness, extended mind, and most recently, relational AI.

Presentation 3 **IoT, Sensor Data and Customer Relationship Management: Coverage Choice, Pricing and Information in Automobile Insurance**
Miremad Soleymanian[1], Charles B. Weinberg[1], Ting Zhu[2], [1]University of British Columbia, Vancouver, BC, Canada; [2]Purdue Unversity, West Lafayette, IN
Abstract: The Internet of Things (IoT) is reshaping business models and changing customers' behavior across industries. In this paper, we examine the role of usage-based auto insurance (UBI), an IoT-based technology, on customers' decisions to change their insurance coverage. Adopters of the UBI monitoring technology have the opportunity to be informed about their actual driving behavior and earn a discount accordingly. Using a sample of 135,540 customers, we study whether UBI can facilitate the upselling and cross-selling efforts of the firm, possibly leading to higher customer lifetime value. Our results suggest that UBI customers are more likely to change their coverage choice than non-UBI customers at first renewal. Both price discounts and the information provided by UBI affect the customers' coverage changes. Among UBI customers, while those who get higher UBI discounts are more likely to both increase their insurance coverage (upselling) and add the comprehensive coverage option which is not directly related to driving behavior (cross-selling), the customers having received more negative feedback (daily hard brakes) are more likely to upgrade their insurance coverage (upselling) only.

Presentation **Session Chair**
Miremad Soleymanian, University of British Columbia, Vancouver, BC, Canada.

Session TB11 **Behavioral Modeling I**
11
10:15 AM - 11:15 AM

Presentation 1 **How Difficult Is Tipping. Using Parametric And Nonparametric Approaches To Estimate Decision Costs**
Kwabena B. Donkor, University of California, Berkeley, Berkeley, CA, Contact: k.b.donkor@berkeley.edu
Abstract: Does a menu of recommended tips presented with a bill influence how much customers tip? Analyzing three quarters of a billion passenger tips in New York City Yellow taxis, we use changes in the menu presented to passengers to nonparametrically estimate that the decision cost of not following a menu is about $1.89 (16% of the aver- age taxi fare of $12.17). To disentangle the mechanisms behind decision costs, we use a model in which customers' choices are based on their beliefs about the social norm tip. They incur a norm deviation cost for not conforming to the tipping norm and a cognitive cost from computing a non-menu tip. Our estimate of the distribution of passenger beliefs about the social norm tip averages at 19.8% of the taxi fare. Customers incur a norm deviation cost (shame) of $0.42 when they tip five percentage points less. The cognitive cost of calculating a non-menu tip ranges from $1.26 to $1.41 on average. We also find that taxicabs currently present customers with a nearly tip-maximizing menu, and this menu increases tips by 12.4% relative to not presenting a menu. Taxicab companies appear to have learned over time to converge to the tip-maximizing menu. Our welfare calculations suggest that the current tip menu increases welfare by $1.03 per taxi trip relative to not presenting a menu.

Presentation 2 **Modeling Compensatory And Non-compensatory Biases: Assessing The Calibration Of Movie Award Prediction Markets**
Vahid Karimi Motahhar[1], Thomas S. Gruca[2], [1]University of Iowa, Iowa City, IA, [2]University of Iowa, Iowa City, IA, Contact: vahid-karimimotahhar@uiowa.edu
Abstract: Studying the calibration of prediction markets can help marketing managers and other users of prediction markets to gain insight into their accuracy. Prior research on the calibration of prediction markets has considered only compensatory biases, e.g., favorite-long shot bias. Furthermore, of the two major types of prediction markets—Hanson's market maker and dual-auction—only the calibration of the latter one has been studied. We show that, at the aggregate market level, miscalibration can result in one or both of the two possible types of biases: compensatory (favorite longshot bias or reverse favorite longshot bias) or non-compensatory (optimistic bias or pessimistic bias). We propose a statistical model to detect the presence of both of these biases. Our data comes from Media Predict that uses the Hanson market maker to set prices. Our focus is a set of prediction markets focused on the Academy Awards (or Oscars) nominations and winners. Our results across 183 contracts finds significant evidence of a favorite longshot bias in both types of markets, Nomination and Winner markets. We find significant evidence of the optimistic bias only in the Nomination markets. We discuss the possible psychological mechanism that may underlie these results.

Presentation 3 **Predicting Choice Averse and Choice Loving Behavior in a Quasi-field Experiment with Actual Shoppers**
David Ong, Jinan University, Guangzhou, China.
Abstract: A large body of chiefly laboratory research has attempted to demonstrate that people can exhibit choice averse behavior (CAB), i.e., a lower probability of an active choice, from cognitive overload when faced with many options. However, meta-analyses of these studies, which are generally of one or two product lines, reveal conflicting results. Findings of CAB are balanced by findings of choice loving behavior (CLB). Unexplored is the possibility that many consumers may purchase in order to discover their preferences for unfamiliar products, rather than attempt to determine their taste before purchase. We model such 'sampling behavior' and predict that the purchases of unfamiliar consumers increase with the available number of varieties for popular product lines and decreases for niche product lines. To test these predictions, we developed a measure of popularity and surveyed 1,440 shoppers for their preferences over 24 product lines with 339 varieties at a large supermarket. We video recorded 35,694 shoppers' behavior after we randomly reduced the varieties they faced on shelves. As found in the meta-studies, we observed both CLB and CAB. However, in accordance with our prediction, the probability of CLB increases with the number of available varieties for popular product lines, whereas CAB increases with available varieties for niche product lines.

Presentation 4 **Linguistic Analysis Of Psychological Distancing: Reading Between The Lines For Unexpressed Bad News**
Piyush Anand[1], Manoj Thomas[1], Kishore Gopalakrishna Pillai[2], Yue Meng-Lewis[3], [1]Cornell University, Ithaca, NY, [2]Amrita Vishwa Vidyapeetham, Coimbatore, India; [3]The Open University, Milton Keynes, United Kingdom. Contact: pa349@cornell.edu
Abstract: Psychological distance is an important predictor of everyday judgment and decision making. Building on recent advances in text analysis methodologies, we propose and empirically validate a multi-dimensional approach to measure psychological distance. Specifically, we demonstrate how to quantify the three fundamental dimensions of psychological distance—abstractness, temporal distance, and personal distance—from unstructured text. We validate the methodology using a controlled experiment and in a field setting, using chairpersons' annual letters to shareholders. Our results show that chairpersons psychologically distance themselves from poor financial performance and this distancing is predictive of their future performance. We propose that psychological distance is an indicator of unexpressed bad news and it is distinct from other sentiment analysis constructs such as emotionality and certainty.

Presentation **Session Chair**
Piyush Anand, Cornell University, Ithaca, NY

Thursday, June 11, 2020
Session "TC"
11:30 AM - 12:30 PM

TC01. Machine Learning, Artificial Intelligence, and Causal Inference in Marketing III

TC02. Digitization 4: Platforms

TC03. Game Theory: Platforms I

TC04. Understanding the Retail Consumer: Insights, Implications, and New Directions

TC05. Advertising Response

TC06. Social Media and Engagement II

TC07. Choice Modeling II

TC08. NO SESSION

TC09. Visual Image Analysis and ML

TC10. New Products and Adoption I

TC11. Improving Forecasts of Consumer and Firm Choices with Neuroscience

Session TC01 **Machine Learning, Artificial Intelligence, and Causal Inference in Marketing III**
01
11:30 AM - 12:30 PM

Presentation 1 **An Interpretable Approach to Predicting Consumer Activity with Omnichannel Data**
Chenshuo Sun, Anindya Ghose, Xiao Liu, New York University, New York, NY
Abstract: Understanding how to unlock the power of knowledge from multiple data sources and how to paint a holistic view of the customers is drawing increasing attention, as companies are embracing the explosion of consumer data to optimize their business strategies. In this research, we propose a similarity-based multi-view learning method to merge omnichannel behavioral data generated by customers, in which we: (1) use the similarity between customers to form the single-view embeddings to profile customers in each single channel, and (2) leverage multi-view learning algorithms to combine the information from various channels. We evaluate the proposed method with two downstream tasks: similar customer detection and customer engagement prediction. The analyses are enabled by a dataset that matches customers' omnichannel activities on the individual level. We show that the proposed method can improve the performance in both tasks compared to all benchmark algorithms and the similarity-based single-view embedding, which itself outperforms random guess. The mechanism has to do with sparsity and complementarity, that is, the main driving force of the improvement of performance comes from the fact that exploiting the complementary-based multiview algorithm can prompt the secondary data source to complement the sparse primary data source.

Presentation 2 **Can AI Take Emotional Jobs? The Effects of Emotional Bot from Field Evidence**
Yuqian Chang[1], Yuqian Chang[1], Zheng Fang[2], Jaakko Aspara[3], [1]Temple University, Philadelphia, PA, [2]Fudan University, Shanghai, China; [3]Aalto University, Helsinki, Finland.
Abstract: Emotional intelligence has been featured as the ultimate form of artificial intelligence design — something that is hard or even impossible to achieve for machines, robots, or artificial intelligence (AI). However, emotional labor jobs, which require employees to regulate their emotions during interactions with customers, are oftentimes poorly delivered by humans. Against this backdrop, the present research focuses on the following research questions. First, can AI service agents take emotional job as effectively as human service agents? Second, for which emotions may AI chatbots be more effective? and what is the underlying mechanism? Third, in what situations may emotional AI chatbots be more effective? With a randomized field experiment of collecting overdue loan repayment by AI chatbot or Human with different emotions, our results suggest that AI is actually more effective in delivering emotional influence than human. In general, AI happy emotion is more effective in collecting overdue payment, which is mediated by customer perceived courtesy of service agents and emotional peace. When the overdue is less (vs. more) severe, AI happy (vs. angry) emotion has a higher efficacy. Our findings suggest ample potential for AI to fill in emotional labor supply.

Presentation 3 **Happiness Begets Money: Emotion and Engagement in Live Streaming**
Dai Yao[1], Yan Lin[2], Xingyu Chen[2], [1]National University of Singapore, Singapore, Singapore; [2]Shenzhen University, Shenzhen, China.
Abstract: Live streaming offers an unprecedented opportunity for content creators (broadcasters) to deliver their content to consumers (viewers) in real time. In a live stream, viewers may send virtual gifts (tips) to the broadcaster, and/or engage free of charge using likes and chats. These activities reflect the underlying viewer emotion, and are likely to be affected by the broadcaster emotion. This paper examines the role of emotion in interactive and dynamic business settings such as live streaming. To account for the possibility that broadcaster and viewer emotion, and viewer activities influence each other, we develop a panel vector autoregression (PVAR) model and apply it to data from 1,450 live streams. We find that as broadcasters become happier, viewers also become happier, and vice versa. In addition, when a stream atmosphere becomes more positive, both tips and likes from viewers intensify. Interestingly, the positive effect of emotion on tipping is only short-lived but on liking is enduring. We also find asymmetric effects within the two types of viewer activities: While tipping boosts liking, there is no evidence of the opposite. Finally, we illustrate the financial returns for live streaming platforms and broadcasters from marketing interventions such as enhancing the broadcaster's emotion.

Presentation **Session Chair**
Dai Yao, National University of Singapore, Singapore, Singapore

Session TC02 **Digitization 4: Platforms**
02
11:30 AM - 12:30 PM

Presentation 1 **Seller Composition**
Yufeng Huang, University of Rochester, Rochester, NY
Abstract: The success of a platform depends not only on the number of sellers but also on their composition. This research quantifies the role of seller composition on the Airbnb platform, and evaluates alternative platform designs or regulation policy. I first document heterogeneity in pricing strategies and other characteristics among the equilibrium set of sellers, and how this heterogeneity responds to changes in the city's regulation policy. Next, I structurally characterize consumer demand and seller's pricing and participation decisions. I use the model to simulate optimal platform design strategies.

Presentation 2 **Sleeping with Strangers: Estimating the Impact of Airbnb on the Local Economy**
Yongseok Kim[1], Davide Proserpio[2], Suman Basuroy[1], [1]University of Texas-San Antonio, San Antonio, TX, [2]University of Southern California, Los Angeles, CA
Abstract: We study the effect of Airbnb on restaurant revenue in the state of Texas using a difference in difference strategy that exploits the geographical and temporal variation of Airbnb's entry in Texas to show that a 10% increase in Airbnb listings is associated with a 0.05% increase in restaurant revenue. At the sample average year-over-year Airbnb growth, this translates to a 5% contribution to the average year-over-year growth in restaurant revenue. Moreover, we show that these results are driven by zipcodes traditionally not considered touristy. Our results suggest that home-sharing platforms like Airbnb can support local economies through the redistribution of travelers across different areas of the city they enter.

Presentation 3 **Dog Eat Dog: Measuring Returns to Scale Using a Digital Platform Merger**
Jessica Fong[1], Chiara Farronato[2], Andrey Fradkin[3], [1]University of Michigan, Ann Arbor, MI, [2]Harvard Business School, Boston, MA, [3]Boston University, Boston, MA
Abstract: Large digital platforms are economically important and are increasingly the subject of regulatory scrutiny. These platforms may improve welfare if network effects are sufficiently large but they may also harm users if they exercise market power. We study the merger of the two largest platforms for pet-sitting services and use it to measure network effects. Despite being of similar size and competing in the same geographies, the two platforms did not fully converge in outcomes prior to the merger. Transaction prices and the ratio of buyers to sellers differed between the platforms. This divergence is consistent with a limited degree of multi-homing -- only 3% of buyers and 8% of sellers transacted on both platforms. We use variation in pre-merger market shares across cities to measure the effects of the merger. We do not find evidence supporting increasing returns to scale, not on the extensive margins --- user adoption and retention, total transactions --- nor on the intensive margins --- conversion rates and various proxies for match quality.

Presentation **Session Chair**
Jessica Fong, University of Michigan, Ann Arbor, MI

Session TC03 **Game Theory: Platforms I**
03
11:30 AM - 12:30 PM

Presentation 1 **Spatial Distribution Of Supply And The Role Of Market Thickness: Theory And Evidence From Ride Sharing**
Soheil Ghili, Vineet Kumar, Yale University, New Haven, CT, Contact: soheil.ghili@yale.edu
Abstract: This paper develops a strategy with simple implementation and limited data requirements to identify spatial distortion of supply from demand --or, equivalently, unequal access to supply among regions-- in transportation markets. We apply our method to ride-level, multi-platform data from New York City (NYC) and show that for smaller rideshare platforms, supply tends to be disproportionately concentrated in more densely populated areas. We also develop a theoretical model to argue that a smaller platform size, all else being equal, distorts the supply of drivers toward more densely populated areas due to network effects. Motivated by this, we estimate a minimum required platform size to avoid geographical supply distortions, which informs the current policy debate in NYC around whether ridesharing platforms should be downsized. We find the minimum required size to be approximately 3.5M rides/month for NYC, implying that downsizing Lyft or Via--but not Uber--can increase geographical inequity.

Presentation 2 **Design Of Reputation Systems: Optimal Information Disclosure**
Zijun June Shi[1], Kannan Srinivasan[2], [1]The Hong Kong University of Science and Technology, Hong Kong, Hong Kong; [2]Carnegie Mellon University, Pittsburgh, PA, Contact: juneshi@ust.hk
Abstract: Reputation systems play a central role in a variety of marketplaces to eliminate information asymmetry existing between sellers (students) and buyers (employers). Despite its crucial role, the design of reputation systems remains a complicated issue. Platforms, as an additional player added to the conventional seller-buyer games, is the designer of such reputation systems. Some platforms try to disclose as much product information as possible through their reputation systems, by encouraging consumers to leave reviews or ratings. In contrast, some platforms disclose only partial product information to the public. This paper studies the optimal information disclosure in a reputation system from the platform's profit standpoint. In a three-player game, the seller decides effort level, the platform decides the amount of information about the seller's quality (i.e., product ratings) to disclose, and the future consumer as the receiver makes the purchase decision after observing the signal which is a noisy signal of the true product quality. By modeling consumers as Bayesian learners, we specify conditions under which withholding some private information of sellers can serve the platform's goal to maximize profit by incentivizing seller investment in quality. We find that, although fully disclosing information can eliminate information asymmetry, it may hinder the agents' incentive to invest in quality, which hurts the platform's profit. Two main effects are in favor of withholding private information: quality improving effect which makes sellers more willing to invest in quality, and sales increasing effect which leads to more transactions on the platform.

Presentation 3 **ENTRY OF PLATFORMS INTO COMPLEMENTARY HARDWARE ACCESS PRODUCT MARKETS**
Siddhartha Sharma[1], Amit Mehra[2], [1]Carnegie Mellon University, Pittsburgh, PA, [2]UT Dallas, Dallas, TX
Abstract: Access to a platform's services often requires consumers to use a complementary hardware product or service, e.g., Internet service is needed to access the YouTube platform. Typically, such access products are provided by third-party firms. More recently, however, some major platforms like Google have themselves ventured into providing these access products. For example, Google Fiber provides access to YouTube. In this paper, we examine the effect of a platform's entry into an access product market when the profits from the platform's advertising business depend upon the quality of the access products. We develop a theoretical model to study this context and find that such an entry by the platform (i) can lead the platform to provide a higher quality access product than the third-party firms at a lower price, (ii) may, in contrast to the entry by a third-party firm, lead to higher-quality access product by both the platform as well as the firms, (iii) improves the platform's profits even if the platform makes losses from the access product sales, and (iv) increases consumer surplus even though the platform becomes more dominant due to its entry into the access product market. All the results are driven by the positive association between the platform's advertising profits and the quality of access products in the market.

Presentation **Session Chair**
Siddhartha Sharma, Carnegie Mellon University, Pittsburgh, PA

Session TC04 **Understanding the Retail Consumer: Insights, Implications, and New Directions**
04
11:30 AM - 12:30 PM

Presentation 1 **Looking Backward to Look Forward: A Meta-Analytic Understanding of Retail Customer Loyalty**
Yuping Liu-Thompkins, Leila Khoshghadam, Saeed Zal, Arjang Attar Shoushtari, Old Dominion University, Norfolk, VA
Abstract: The frequent and intense debate around the fate of customer loyalty in retail practice reflects the uncertain nature of loyalty in today's retail landscape. With many more brands to choose from and much more product information at consumers' disposal, the motivation behind and path toward loyalty are both evolving. Does customer loyalty still matter? Have the key drivers of customer loyalty in the retail channel changed? To answer these questions, this research presents a meta-analysis of customer loyalty research conducted in the retail context over the last 50 years, both to construct a roadmap of where we have been and to delineate where we should go from here. Within the overall theme, the current analyses aim to achieve four specific research objectives: (1) to identify the personal cognitive, personal affective, and social drivers of retail customer loyalty; (2) to trace changes in the relative importance of these loyalty drivers over time; (3) to understand the role of retail context (including the retail product and the retailer) in determining the drivers of customer loyalty; and finally (4) to identify the impact of using different retail customer loyalty metrics on research findings.

Presentation 2 **What Drives Consumers to Shop on Mobile Devices: Findings from a Meta-analysis**
Beatrice Luceri[1], Tammo H. A. Bijmolt[2], Silvia Bellini[1], **Simone Aiolfi**[1], [1]University of Parma, Parma, Italy; [2]University of Groningen, Groningen, Netherlands.
Abstract: Mobile devices penetration is growing at an exceptional rate, thus reshaping consumers shopping experiences and habits. Today mobile commerce generates 63.5% of total retail e-commerce sales worldwide and this share is expected to reach 72.9% by 2021 (Statista, 2019). The need to systematize this new topic from a theoretical perspective has translated into qualitative and quantitative literature reviews (e.g. Groß, 2015; Natarajan et al., 2017; Zhang et al., 2012). Specifically, Zhang et al. (2012) provide the first meta-analysis on mobile commerce adoption, integrating studies published mostly in the Information Systems field. Given the relevance and dynamics of the phenomenon, this paper aims to update and expand the knowledge of mobile shopping behaviors, investigating the moderating effect both of culture and other factors related to the shopping context and study design. The study is based on three phases. First, an overall review of the literature on mobile commerce from 2000 to 2020 (data collection) is conducted to identify all the studies consistent with the topic: we identified 820 articles from Web of Science, 611 articles from Ebsco and 322 articles from Scopus. Secondly, each paper is read through to collect all useful information needed in the meta-analysis (data coding). Therefore, the number of valid papers has been reduced and we have identified 465 articles (363 are journal articles and 102 conference proceedings). Finally, the analysis of the dataset through univariate or multivariate meta-analytic techniques is done. These techniques are opportunely adapted to assess the strengths and generalizability of the predictor-outcome variables of mobile shopping adoption as well as the identification of relevant moderators. The effects of these moderators is tested using meta-regression. Next, a new theoretical framework is proposed and tested using model-driven meta-analytic structural equation modeling (Becker, 2001; Cooper et al., 2009).

Presentation 3 **AI-Based Retail Promotion Strategies - Review and New Directions**
Maria Petrescu[1], **John Gironda**[2], J. Ricky Fergurson[3], Anjala Krishen[4], [1]ICN Business School, Nancy, France; [2]University of North Carolina at Wilmington, Wilmington, NC, [3]Indiana State University, Terre Haute, IN, [4]University of Nevada, Henderson, NV
Abstract: The use of artificial intelligence (AI) in business and marketing has significantly increased over the past decade. This usage continues to intensify as the number of platforms and applications that rely on artificial intelligence rises in terms of the variety of contexts, including both traditional and online retailing, which has the potential to significantly impact opportunities for consumers and marketers alike. Through the use of enhanced data interpretation, machine learning, and flexible adaptation, AI can be used to both enhance business performance and optimize customer's experiences. In the context of retailing, some of the benefits of AI include an increased understanding of customers' needs via learning from their past behavior, as well as supply chain and inventory optimization, and the ability to assist both shoppers and managers in their decision making. All of these have the potential to improve relationships between retailers and customers. Given these developments, a stream of research related to AI's impact on marketing has begun to emerge. Consequently, we believe that both marketers and practitioners alike would benefit from a systematic review and summary of findings of research on AI in marketing. Therefore, through the use of meta-analysis and bibliometric analysis, this study seeks to synthesize the empirical contributions on the use of artificial intelligence in analyzing and managing data in retail promotion strategies. A study such as the one conducted here should help to obtain generalizable insights and managerial implications, as well as formulate new directions for future research, and lead to uncovering new knowledge regarding the modern retailing environment.

Presentation **Session Chair**
Beatrice Luceri, University of Parma, Parma, Italy.

Session TC05 **Advertising Response**
05
11:30 AM - 12:30 PM

Presentation 1 **Is The Hierarchy Of Effects Dead Or Alive?**
Albert Valenti[1], Gokhan Yildirim[2], Marc Vanhuele[3], Shuba Srinivasan[4], Koen Pauwels[5], [1]IESE Business School, Barcelona, Spain; [2]Imperial College of London, London, United Kingdom; [3]HEC Paris, Jouy-en-Josas, France; [4]Boston University, Boston, MA, [5]Northeastern University, Newton, MA, Contact: avalenti@iese.edu
Abstract: Advertising influences purchase behavior when it changes how consumers think and feel about brands. While the Hierarchy of Effects (HoE) model has guided advertising decisions for decades, an extensive review found little support for any hierarchy, thus implying the death of HoE. However, that conclusion was not based on empirical comparisons of possible hierarchies. This paper analyzes how mindset metrics intermediate the marketing effects on sales for the top brands in fifteen categories over seven years. It compares the fit of 26 models proposed in the literature, and concludes that the original concept of hierarchy (which signifies "sequentiality") holds up firmly. However, the sequence varies across brands, with the Affect→Cognition→Experience being the most prevalent. Classical dimensions of category characteristics (hedonism and involvement) do not predict which sequence applies, but do moderate the effects of marketing on mindset metrics. For one, promotions influence Experience more for low-involvement products. The results give brand managers the key insight that the exact hierarchical sequence can make a real difference for advertising efforts that influence consumers' hearts, minds, and experiences.

Presentation 2 **The Immediate Effect Of Advertising On Snack Food Consumption**
Yi-Lin Tsai[1], **Mark Ratchford**[2], Daniel Mochon[2], Marina Girju[3], [1]University of Delaware, Newark, DE, [2]Tulane University, New Orleans, LA, [3]California Baptist University, Riverside, CA, Contact: mratchford@tulane.edu
Abstract: A well-established stream of research in Marketing investigates the effect of advertising on consumer purchasing behavior. Yet, there has been far less focus on a related but equally important research question to marketers: the effect of advertising on consumption. Whether there may be an immediate effect of advertising on consumption, in the sense that simply viewing an ad can cue an individual to consume a product in the advertised category, remains a relatively unexplored empirical research topic. In this study we attempt to quantify the short-term effect of advertising on snack food consumption in the United States. We fuse a large and unique rolling cross-sectional dataset collected from 2004 through 2010 by one of the largest global snack food companies with Kantar national- and local-level advertising data in order to address this research question. Our data includes 18,026 panelists living in 1080 US counties (128 DMAs). We employ a "border strategy," which uses the quasi-random variation in advertising generated by the borders of televisions markets to account for the endogeneity of advertising (e.g., Shapiro 2018; Tuchman 2019). We consider two different dependent variables: (1) the number of snacking occasions in a given day, and (2) whether there was snacking in a given day (Yes = 1/No = 0). Our results suggest a significant positive effect on both the number of snacking occasions and whether there was snacking in a given day within both snack type and snack category (13 snack categories). We additionally examine the heterogeneity of the effect across categories and demographic groups, finding the effect varies across each.

Presentation 3 **Should Major Advertisers Pull Spend From TV? Evidence From The U.S. Wireless Industry Using Debiased Synthetic Control**
Jia Liu[1], Shawndra Hill[2], [1]Hong Kong University of Science & Technology, Clear Water Bay, Hong Kong; [2]Microsoft Research, New York, NY, Contact: jialiu@ust.hk
Abstract: We develop a Debiased Synthetic Control method to account for the causal impacts of multiple discrete/continuous treatment variables that exhibit spillover effects across units, which allows to debias interfering "treated" and "control" units when conducting counterfactual analysis. We apply our proposed method to study the impact of major TV advertisers temporarily discontinuing TV advertising on consumer online search behavior, by leveraging a field experiment in the U.S. wireless industry in which our focal brand stopped its TV advertising for one week. We find that this intervention resulted in a significant 5% reduction of the focal brand's daily search volume. This effect initially occurred after only two days, but once TV advertising was resumed at the regular level, it took two weeks for search volume to return to the prior level. In addition, we find large treatment heterogeneity across topical search categories. For instance, search traffic was more likely to be reduced (up to 40% per day) for searches that are relevant to the content of TV commercials, but this effect also wore off much faster. Lastly, we find a positive spillover effect of the intervention on the focal brand's competitors, which is usually very short-lived and hence generally insignificant.

Presentation 4 **Investigating The Effects Of Including Discount Information In Advertising**
Shirsho Biswas, University of Chicago Booth School of Business, Chicago, IL, Contact: sbiswas@chicagobooth.edu
Abstract: Consider a display ad for a new pizza brand that announces a discount. Such discount advertising mentions the brand and often shows a picture of the product, thus informing consumers of the brand and some characteristics (the 'brand advertising effect'). It also highlights a discount, thus informing consumers of the existence of a discount (the 'pure promotion effect'). There could be a third effect, the 'discount spotlighting effect' - a reduction in brand preference from discount advertising that arises from the brand *choosing* to highlight a discount in its advertising and marketing itself based on low price. These three effects are typically confounded and, in particular, the 'discount spotlighting' effect has not been studied before. Two identical consumers, one who has seen a brand ad and then found out about the discount separately, and another one who has seen a discount ad, have the same information about the brand and the discount. However, they will have different probabilities of purchase due to the 'discount spotlighting' effect. I demonstrate the existence of this effect by designing and implementing a field experiment on a food delivery app with exogenous variation in advertising intensity, the presence of discount information in ads, and discount level for a focal restaurant. More broadly, I use this experiment to investigate the differences in the effects of ads with and without explicit discount information on (1) demand (2) different stages of the purchase funnel and (3) search and demand for non-advertised rivals. I show that discount oriented advertising can induce more consumers to search for the product, but reduces conversion conditional on search for a given consumer relative to brand advertising. Further, I show that targeting different consumers with brand oriented or discount oriented advertising along with targeted discounts based on their probability of search and conditional purchase increases firm revenue relative to a single, optimal type of advertising and discount level. Implications for the platform on which firms compete and advertise are also discussed.

Presentation **Session Chair**
Shirsho Biswas, University of Chicago Booth, Chicago, IL

Session TC06 **Social Media and Engagement II**
06
11:30 AM - 12:30 PM

Presentation 2 **Goal Pursuit Behaviors On Social Media**
Nathan Zhi Huang[1], Keehyung Kim[2], Kevin Chung[1], [1]University of Wisconsin-Madison, Madison, WI, [2]Chinese University of Hong Kong, Shatin, Hong Kong. Contact: zhi.huang@wisc.edu
Abstract: Goal gradient theory states that people exert more effort when their goals are near completion. While this behavior has been previously documented they were done mostly via experiments. We add to this literature by studying a large data set of 28 million posts made by 37,000 users in the Instagram platform. Exploiting detailed individual post level data, we document that as users gain follower numbers that approach their "milestone" values (i.e., the multiples of power of ten such as 10,000, 20,000 followers etc.), they exhibit acceleration in their post frequency, with its effect becoming larger for those who experienced greater follower growth rate. This effect is robust across various specifications while the falsification test with random milestones exhibiting null effects.

Presentation 3 **The Role Of Motivations And Emotional Tone In Message Virality: Evidence From Twitter**
Fereshteh Zihagh[1], Brian T. Ratchford[2], Masoud Moradi[3], [1]The University of New Haven, West Haven, CT, [2]The University of Texas at Dallas, Plano, TX, [3]Texas State University, San Marcos, TX
Abstract: In this paper, we develop an empirical model to study how users' social capital, mediated by image motives (i.e., driven by the perception of others) and intrinsic motives (i.e., driven by personal satisfaction rather than posting consequences), influences the propensity to post/retweet positive or negative contents online. Our findings show that the identity of users can explain their motivations to post on online platforms and the receivers' engagement with the posted contents. Results show that there is an inverted U-shaped relationship between the number of followers and motives. The breakdown of motives reveals that both image and intrinsic motives are highest for users with a medium number of followers. Moreover, we find that as the number of followers increases, users are more likely to post due to intrinsic motives than image-related motives. Even though users with a higher number of followers believe negative content can lead to more virality, they do not post negative content mainly because they do not care as much about the reciprocity from followers as they care about the intrinsic satisfaction they derive from posting content. The results of our model show that intrinsic motives are more conducive to posting of positive content. On the other hand, image motives are associated with the negative content but have no significant association with the positive content. The findings have implications for designing social media content strategy and fostering reader engagement.

Presentation 1 **Increasing Consumer Engagement With Firm-generated Social Media Content: The Role Of Images And Words**
Eugene Pavlov, Natalie Mizik, University of Washington, Seattle, WA, Contact: epavlov@uw.edu
Abstract: As firms are embracing visual platforms in their marketing and branding efforts, little research exists on the relative effectiveness of visual versus text-based marketing efforts. We develop a quantitative framework to study how text and visual components of firm communications impact consumer engagement with firm-generated social media content. First, we quantify the emotional loading of text and imagery on Sentiment and Arousal dimensions. We use existing NLP tools for text and use machine learning and computer vision to develop and train Sentiment and Arousal classification models for imagery. We use basic elements of design (color, texture, shape, lines, curves, corners, edges, orientation, etc.) as inputs to predict Sentiment and Arousal of an image (imagesentiment.com). Our lab-based validation of classification accuracy suggests machine-human agreement in the range of 75%-80%. Next, we apply the procedure to empirical analysis of engagement (retweeting) with firm-generated content based on 1.3M tweets of 600+ brands from 11 categories, posted since 2008. Our findings suggest that over the years, consumers became less engaged with high-Arousal text. We do not find a similar decline in effectiveness for high-Arousal imagery. We find significant heterogeneity of image effects by industry, with positive and high-Arousal imagery being the most engaging for quick-service restaurants, and negative imagery being the most engaging for charities/non-profits.

Presentation **Session Chair**
Fereshteh Zihagh, The University of Texas at Dallas, Richardson, TX

Session TC07 **Choice Modeling II**
07
11:30 AM - 12:30 PM

Presentation 1 **A Choice Model For Multiple Goal Pursuit**
Taegyu Hur[1], Greg M. Allenby[2], [1]The Ohio State University, Columbus, OH, [2]The Ohio State University, Columbus, OH, Contact: hur.71@osu.edu
Abstract: Consumers often try to achieve multiple goals when purchasing products and services, where choices are sought that maximize utility and other objectives such as social desirability or risk minimization. If the choice outcomes are associated with high level of uncertainty at the time of purchase, for example, consumers might worry that the actual outcomes might be different from their expectations and they want to avoid this when making a purchase. We propose a general model of multiple goal pursuit and apply it to a utility maximization and regret minimization problem. Pareto optimal sets are an outcome of multiple goal optimization problems where there exists multiple alternatives that are non-dominated. We investigate the use of ε-constraint methods in a discrete choice setting, and show that our proposed model fits the data better, provides improved predictions and offers a tractable solution to multiple goal optimization for discrete choices.

Presentation 2 **A Unifying And Parsimonious Model Of Anchoring And Context-dependent Preferences**
Arnaud De Bruyn[1], Prithwiraj Mukherjee[2], Ayse Onculer[1], [1]ESSEC Business School, Cergy, France; [2]Indian Institute of Management Bangalore, Bangalore, India. Contact: debruyn@essec.edu
Abstract: We demonstrate that the four most documented violations of the independence of irrelevant alternatives assumption in customer choices (i.e., the compromise effect, the similarity effect, the attraction effect, and the status quo bias) can all be explained by the single phenomenon of anchoring. Specifically, to explain those phenomena, we only need (1) to adopt a vector-based representation of customer preferences, and (2) to tilt preference vectors in the direction of existing anchors. We illustrate graphically how preference reversals occur in all four scenarios, and offer formal proofs of the same. We then demonstrate that this framework sheds new light on well-known managerial situations, such as the difficulty for radical innovations to penetrate a well-established market, the acceleration effect in fashion, or the role of experts as early adopters. Finally, we empirically test the model with experimental data. Our assumption requires to add only one parameter to the choice model; choice-prediction errors decrease by 33%.

Presentation 3 **Product Claims About Magic Ingredients: Implications For Consumer Choice And Welfare**
Kaiyang Wu, Neeraj Arora, University of Wisconsin-Madison, Madison, WI
Abstract: Brands often add unique ingredients (e.g. prickly seed oil) to their products even when those ingredients' efficacy is ambiguous and scientifically unproven. In this paper, we name such ingredients magic ingredients (MI) and call product claims about magic ingredients CMI. Across four experiments that includes a national sample, and by employing model-based inference, we find that the inclusion of CMI increases consumers' likelihood of choosing the focal product. Our hierarchical Bayes approach delineates heterogeneity in the CMI effect that can be explained by individual's demographic information and personality traits, helping us to identify the consumer groups that are more susceptible to the CMI effect. We find that while CMIs benefit private label brands, the presence of CMIs could hurt national brands that have a large market share. In addition, we present empirical evidence that demonstrate the CMI effect can be enhanced by pairing CMI with luxurious brands but not with inexpensive brands. Our findings could be used to educate consumers to objectively evaluate CMIs. In addition, our findings suggest policy implications for interventions that limit the use of CMIs by firms.

Presentation 4 **Clever Randomization and Ensembling Strategies for Accommodating Multiple Data Pathologies in Conjoint Studies**
Marc Dotson, Jeff Dotson, Brigham Young University, Provo, UT
Abstract: Respondent behavior in conjoint studies often deviates from the assumptions of random utility theory. We refer to deviations from normative choice behavior as data pathologies.A variety of models have been developed that attempt to correct for specific pathologies (e.g., screening rules, respondent quality, attribute non-attendance). While useful, these approaches tend to be both conceptually complex and computationally intensive. As such, these approaches have not widely diffused into the practice of marketing research.In this paper we draw on innovations in machine learning to develop a practical approach that relies on (clever) randomization strategies and ensembling to simultaneously accommodate multiple data pathologies in a single model. We provide tips and tricks on how to implement this approach in practice.

Presentation **Session Chair**
Marc Dotson, Brigham Young University, Provo, UT

Session TC08
08
11:30 AM - 12:30 PM

NO SESSION

Session TC09 **Visual Image Analysis and ML**
09
11:30 AM - 12:30 PM

Presentation 1 **Consider This: The Role Of Images During The Consideration Set Formation While Searching For Hotels Online.**
Gijs Overgoor[1], Bill Rand[2], Willemijn Van Dolen[1], Steven Scholte[1], [1]University of Amsterdam, Amsterdam, Netherlands; [2]North Carolina State University, Raleigh, NC, Contact: g.overgoor@uva.nl
Abstract: For experience products, images are vitally important in interesting consumers and helping them to make decisions. For example, images were used to sell hotels even before the Internet, when travel agencies would have brochures about hotel properties that they used to entice travelers. On many online travel agency (OTA) websites, a hotel's image can take up 33% of the space on a hotel property page, but the importance of this image in the decision-making process has yet to be studied. In this research, we use convolutional neural networks (CNNs) to extract information directly from hotel images and we apply image analytics to predict the click through rate of hotels using this information. In addition, we perform an experiment in which we use functional Magnetic Resonance Imaging (fMRI) to investigate neural responses to the hotel images. We are able to predict, with decent accuracy, the clickthrough rate (CTR) of a hotel based on only the information extracted from the images using CNNs. Subsequently, our fMRI results show that we are able to make these accurate predictions, because different regions of the brain are engaged when people look at low CTR images as compared to high CTR images. Our model also shows that, especially for the low CTR images, there is increased activation in the parts of the brain responsible for visual processing. These results suggest that consumers use images during the consideration set formation by eliminating those hotels that present thumbnail images that are not appealing rather than looking for those hotels that have appealing thumbnail images. Our image analytics framework and experiment findings help us explain the role of images in the complex process of consumer decision-making online.

Presentation 2 **Visual-Based Brand Perception On Social Media**
Shuya Lu[1], Jianan Wu[2], [1]Cleveland State University, Cleveland, OH, [2]Louisiana State University, Baton Rouge, LA
Abstract: Textual marketing communication is effective in various contexts such as print advertising, user-generated content, and social media (Diamond 1968; Ludwig et al. 2013; Nam and Kannan 2014). However, visual marketing communication studies are limited in the context of print advertising (e.g., Hagtvedt and Brasel 2017). To our best knowledge, the literature on drawing brand meaning from unstructured image data is limited.
In this study, we developed a conceptual framework to examine visual-based brand perception (VBBP) and related concepts on social media. We propose that the VBBP is a co-creational process between a company and its consumers. The co-creational process exhibits three characteristics: i) both a company and its consumers are pivotal authors of brand stories, ii) the process is dynamic that the brand meaning keeps evolving, and iii) the process is dyadic that a company and its consumers keep interacting with each other. In the conceptual model development, we identify six visual attributes as measures of VBBP and adopt a machine learning-based image mining technique to quantify the measures on a large scale. We collected Instagram images using companies' official accounts and customers' hashtag posts. We empirically validated the conceptual model and found that during the co-creational process, both the company and consumer visual-based information richness (VBBP_R) increase over time. Moreover, in examining the difference of VBBP between a company and its consumers, we found that there is a visual-based brand perception gap (VBBP_G) between a company and its consumers. From these findings, we offer three marketing communication strategies to help companies manage their VBBP_G.

Presentation 3 **Effects Of Face And Gaze In A Product Image On Browsing And Ordering**
Eugene Pavlov[1], Zhuping Liu[2], Shuai Yang[3], [1]University of Washington, Seattle, WA, [2]Baruch College, NEW YORK, NY, [3]Donghua University, Shanghai, China.
Abstract: In the apparel sector, a male/female model is often present in product images. How do (1) presence of a model's face and (2) direction of his/her gaze in a product photo affect browsing and ordering? With arguments in favor of both candid and direct gaze, the relative effectiveness of gaze types along the purchasing funnel is not well-understood. We use data on over 60,000 apparel products (with over 240,000 product images) from one of the leading Chinese ecommerce platforms. For face detection, we use both traditional (Viola-Jones) and CNN-based computer vision approaches. For gaze direction detection, we use "GazeFollow" deep NN-based tool. Apart from price, brand fixed effects, and time-based variables, we control for a wide range of product characteristics as captured by bag-of-words of detailed product titles. Face presence is associated with more aggregate product browsing but has insignificant effect on ordering. Interestingly, effect of face presence on browsing is more pronounced for higher-priced products. We further report effects of gaze direction and discuss insights for producers of visual content in fashion sector.

Presentation 4 **Estimating Parameters Of Structural Models Using Neural Networks**
Yanhao Wei[1], **Zhenling Jiang**[2], [1]University of Southern California, Los Angeles, CA, [2]Georgia State University, Atlanta, GA
Abstract: Machine learning tools are increasingly applied in marketing and economics to predict model variables (e.g., text and image categories, economic outcomes). Instead of predicting these variables, we propose using neural networks to estimate the parameters of a given structural model. We train the neural net with model-generated datasets. Through training, the neural net learns a function that maps a dataset directly to the set of parameters under which the dataset is generated. This Neural Net Estimator (NNE) is easy to implement, and can save substantial computational costs for empirical researchers in model estimation and selection. We apply NNE in two Monte Carlo studies: an entry game and a search model. NNE incurs simulation costs that are one to two orders of magnitude smaller than MLE and GMM, while achieving comparable or smaller estimation errors.

Presentation **Session Chair**
Zhenling Jiang, Georgia State University, Atlanta, GA

Session TC10 **New Products and Adoption I**
10
11:30 AM - 12:30 PM

Presentation 1 **Measuring Benefits From New Products In Markets With Information Frictions**
Ilya Morozov, Stanford University, Stanford, CA, Contact: imorozov@stanford.edu
Abstract: Many markets evolve through a constant stream of innovations that allow firms to improve the quality of existing goods or produce entirely new products. How much consumers gain from these new products, however, depends on the extent to which consumers are aware of these products and consider them before making a purchase. I propose an empirical framework that allows researchers to study the demand for new goods in markets where consumers might be imperfectly informed. Using this framework, I study new products in the U.S. hard drive market, a textbook example of a market with ample product innovation. I measure consumer information using unique browsing data that describes which hard drives consumers browse before making a purchase. To ease the computational burden of estimation, I develop and implement a novel Bayesian estimation method that efficiently handles consumer heterogeneity and scales to large numbers of products, thus allowing to accommodate massive product assortments commonly observed in modern online markets. The estimation results suggest that information frictions play an important role in shaping demand for new products. Limited adoption of new products can be mostly attributed to limited search and awareness rather than consumer preferences. These results emphasize the importance of economic policies and marketing strategies that aim to disseminate information about new products, thus helping consumers to reap all potential benefits from new product introductions.

Presentation 2 **MOBILE PAYMENT AND MOBILE PURCHASE BEHAVIOR**
Jaewon Yoo[1], Yuxin Chen[1], Minki Kim[2], Wonjoon Kim[3], [1]New York University - Shanghai, Shanghai, China; [2]KAIST Business School, Seoul, Korea, Republic of; [3]Korea Advanced Institute of Science & Technology, Daejon, Korea, Republic of. Contact: jwyoo4@gmail.com
Abstract: The advent of the digitized economy has changed the payment landscape. Incorporating new biometric technologies such as face recognition, voice recognition, and fingerprint scanning, third-party mobile payments (e.g., Google Pay, WeChat Pay, and Kakao Pay) are gathering a strong customer base. These newly emerging mobile payment services, from the users' standpoint, bring about a substantial shift in their transaction experience as they require fewer tasks to be completed in comparison to the incumbent payment options such as credit card. Drawing from the transaction cost theory and the literature on consumer psychology, therefore, this paper delineates and empirically analyzes the behavioral consequences of the mobile payments under the setting where the customers purchase books in offline stores using their mobile phones. The results confirm that the adoption of a mobile payment significantly increases consumer spending and consumption variety, but decreases concentration on personal favorites. Interestingly, the adoption increases purchase frequency per trip and maximum price of the books purchased as well. Furthermore, supplementary analyses reveal that these effects are not driven by the long-term promotion effect, availability of the mobile payment services, or the customers simply migrating from other channels. Also, the results from the identification tests and robustness checks repeatedly confirm the validity of the theoretical foundation, the mechanisms, and the main results. The implications for consumers and retailers planning to utilize mobile payment services are discussed.

Presentation 3 **Branding Vertical Product Line Extensions**
Thomas Jungbauer[1], Christian Schmid[2], [1]Cornell University, Ithaca, NY, [2]University of Vienna, Vienna, Austria. Contact: jungbauer@cornell.edu
Abstract: Firms that sell vertically differentiated products infrequently roll out multiple products at the same time. In fact, it is often a firm already selling a well-established product, that decides to extend up- or downwards when such an opportunity arises. A critical decision in this scenario is whether to introduce the new product under an existing brand or not. In this paper, we develop a game-theoretic model in which firms expand their product line to cater to a different customer segment, choosing both their branding strategy as well as characteristics of their new products. While we find that the firm's optimal branding strategy depends on both the vertical direction of the expansion and the level of competition, we identify a novel interaction effect between these factors. In particular, firms engaged in direct competition employ branding as a commitment device to soften competition. When these firms expand their product line upwards, this creates a misalignment between firms' actions and consumer preferences. We also derive conditions under which firms, against conventional wisdom, choose to differentiate their products more when selling them under the same brand. Finally, we characterize the welfare effects of branding.

Presentation 4 **The Role Of Relationship Norms In Consumers' Mobile App Adoption Behavior: A Field Experiment**
Lei Liu, Central University of Finance And Economics, Beijing, China.
Abstract: Prior marketing research has proved that consumers use social relationship norms to guide their interactions with brands, thus relationship norm salient at the time of brand-consumer interactions has a significant influence in consumers' attitudes and behaviors. Most research examine two types of relationship norms. Exchange relationship refers to benefits are given to others to get something back while communal relationship refers to benefits are given to show concern for others' needs. However, research also indicate that there exists a mix of communal and exchange relationship. Thus, this article aims to explore the impact of three types of relationship norms (exchange vs. communal vs. a mix of exchange and communal norms) in driving consumers' new product adoption behavior empirically. We conduct a field experiment using a newly-developed mobile APP product for managing diabetes. It is used for diabetes patients to record their daily diet, exercise, medication and blood glucose level, so as to help them control their blood glucose. The result shows that relationship norms play an important role in driving consumers' new product adoption behavior. Compared to communal relationship norm, activating exchange and mixed relationship norms are more likely to lead consumers to continuously use this new product both in the short and long term. However, there is no significant difference between the effects of exchange and mixed relationship norms in the short run, but mixed relationship norm exerts a larger effect in promoting consumers' usage behavior than exchange relationship norm in the long run. Furthermore, gender plays a moderating role in the long term. Specifically, exchange relationship norm is more effective for promoting male participants' adoption behavior. In contrast, communal and mixed relationship norms are more effective for driving female consumers' adoption behavior. The findings provide insights into how firms might manipulate relationship norms to affect consumers' new product adoption behavior more effectively.

Presentation **Session Chair**
Lei Liu, Central University of Economics And Finance, Beijing, China.

Session TC11 **Improving Forecasts of Consumer and Firm Choices with Neuroscience**
11
11:30 AM - 12:30 PM

Presentation 1 **Using Neural Data to Improve Forecasts of Market-level Behavior**
Alex Genevsky[1], Lester Tong[2], Brian Knutson[2], [1]Eramus University, Rotterdam, Netherlands; [2]Stanford University, Stanford, CA
Abstract: Consequential decisions in business and public policy are often based on forecasts of population-level behavior. Improvements in our ability to accurately predict aggregate-level responses will maximize the likelihood of product success and minimize waste of valuable time and resources. Although a growing literature demonstrating the capacity of neural data to forecast aggregate level behavior (see Knutson and Genevsky 2018), no research has yet explored the mechanisms that account for these out-of-sample predictions nor their optimal conditions. In this paper, we examine the role of generalizable and idiosyncratic choice processes in aggregate prediction by exploring how forecasts based on behavioral and neural measures are differentially impacted by the representativeness of the study sample to the market population. Participants in the scanner made incentive compatible decisions regarding projects from a popular online crowdfunding platform. The laboratory sample's behavior and neural activity were then used to forecast preferences in two markets - one representative of the sample and one less representative. We find that when compared to behavioral measures, neural data is less impacted by the representativeness of the sample. Regression models including both behavioral and neural predictors of preference in the representative market indicated that both lab behavior (coef. = .319, SE = .151, $p < .05$) and neural activity (coef. = .613, SE = .211, $p < .01$) accounted for significant and independent variance. However, in the non-representative market, only neural activity was significantly associated with the market preferences (coef. = .656, SE = .217, $p < .01$). These data suggest that neural activity may be a more generalizable index of preference across individuals than self-report measures or observed behavior. In fact, for non-representative samples, only neural activity was a significant predictor of market preference. These data suggest practical implications regarding the use cases in which neural measures can provide the most value to marketers.

Presentation 2 **Neuroforecasting Aggregate Choice in Online Dating: Predicting Aggregate Choices from Small Samples using Neural and Behavioral Measures**
Steve Shaw[1], Vinod Venkatraman[2], Carolyn Yoon[1], [1]University of Michigan, Ann Arbor, MI, [2]Temple University, Philadelphia, PA
Abstract: The ability to predict aggregate, market level choices from a small sample of individuals can provide tremendous value in several domains (e.g., product success, political elections). In this paper, we advance our understanding of decision-making and choice by assessing behavioral and neural approaches to forecasting aggregate choices in an online dating context both within a small sample ($n < 50$) and in an independent simulated market sample ($n > 250$). We first developed a set of stimuli consisting of 36 standardized dating profiles with orthogonalized dimensions, using a 3 x 2 x 2 x 3 factorial design: attractiveness (high, medium, low), age (19-23, 24-28), facial expression (neutral, smiling), and profile description (hobbies/likes, SES/occupation, and personality traits). Respondents made a binary 'like' or 'pass' choice for each profile, and rated each profile on attractiveness, career prospects, likability of personality, and likelihood that the individual in the profile will 'like' them back. Regression results indicated that aggregate in-lab sample ($n = 45$) reported levels of attractiveness, career prospects, personality, and likelihood of 'like' back of profiles explained a significant amount of variance in profile choice likelihood within sample ($F(4, 31) = 45.21$, $p < .01$, $R2Adj = 0.83$) and out of sample/at the market-level ($n = 273$; $F(4, 31) = 15.82$, $p < .01$, $R2Adj = 0.63$). Training a model with these same variables to predict the aggregate choice likelihood of randomly selected holdout profiles (75/25 train/test; 50 iterations) resulted in correct choice likelihood prediction (+/- 5% of actual choice likelihood) 43.5% of the time within sample, and 33.0% of the time for the market population. Next, we will test if neuroimaging data from a small sample of participants can improve these choice predictions. Based on previous research, we hypothesize that while activation in the ventromedial PFC and ventral striatum will aid within sample choice predictions, activity in ventral striatum alone will aid market-level choice predictions (beyond behavioral results).

Presentation 3 **Quantifying the Value of fMRI Data in the Prediction of Success of New Products**
Marton Varga[1], Anita Tusche[2], Paulo Albuquerque[1], Nadine Gier[3], Bernd Weber[4], Hilke Plassman[1], [1]INSEAD, Fontainebleau, France; [2]Queen's University, Kingston, ON, Canada; [3]Heinrich Heine University, Dusseldrg, Germany; [4]Rheinische Friedrich-Wilhelms University Bonn, Bonn, Germany.
Abstract: A growing body of literature established the link between the activity in certain areas of the brain and real-world monetary outcomes. For example, previous studies have used *fMRI* data to explain a large part of the variance in real-world advertising elasticities and market funding outcomes. Given the explanatory power of the recorded brain images. We propose a novel method to predict pre-launch product sales by combining retailer data about competitors with information from traditional surveys in which participants were asked to give their views about existing and new products as well. Importantly, we further add functional magnetic resonance imaging (*fMRI*) data to the model, in which we measure the brain activity of participants during survey questions. We apply our model to data from a large German supermarket chain about the weekly sales of 19 innovative grocery products launched within the last two years. The brain activity of 57 participants was measured while they answered survey questions about the new products in an incentive compatible experiment. We complement this data set with pre-launch and post-launch sales data about the two closest competitors of the innovations. We also obtained additional survey data from participants who typically shop at our retailer indicated their preference for some of the innovations and their respective competitors after seeing pictures and a short description of the items. Using the estimated utility-based coefficients, we forecast the sales and the number of adopting retailers of the innovative products before there are launched and quantify the added value of each information source (*market data*, *survey*, *fMRI*) for prediction accuracy. With our approach, managers can learn the benefits of running *fMRI* studies and/or traditional surveys before new product launch.

Presentation **Session Chair**
Paulo Albuquerque, INSEAD, Fontainebleau, France.

Thursday, June 11, 2020
Session "TD"
12:45 PM - 1:45 PM

TD01. Machine Learning, Artificial Intelligence, and Causal Inference in Marketing IV

TD02. Digitization 5: Experiments

TD03. Game Theory: Platforms II

TD04. How do Retail Assortment Size and Composition Influence Store Image, Store Choice, and Brand Choice? Review and Future Research Directions

TD05. Display Advertising

TD06. Social Media and Engagement III

TD07. Choice Modeling III

TD08. Games and Gaming Platforms II

TD09. Visual Analytics

TD10. Branding

TD11. Laboratory Insights Into Consumer Behavior

Session TD01 **Machine Learning, Artificial Intelligence, and Causal Inference in Marketing IV**
01
12:45 PM - 1:45 PM

Presentation 1 **Persuading under Information Overload: Identifying the Effect of Heuristic Signals in Online Argumentation**
Emaad Ahmed Manzoor, Dokyun Lee, George Chen, Michael D. Smith, Carnegie Mellon University, Pittsburgh, PA
Abstract: Dual-process theories of information processing hypothesize two pathways to persuasion: one via argument content, and the other via heuristic signals. We examine the relative persuasive power of these pathways in the context of online argumentative dialogue. We construct a unique textual dataset of over 300,000 debates from an online argumentation platform containing explicit indicators of successful persuasion. We quantify the relative impact of argumentation skill (a systematic pathway) and user credibility (a heuristic pathway) on persuasion. Our identification exploits the availability of longitudinal records for each user to derive an instrument for their displayed credibility, and to approximate their argumentation skill. We further strengthen our identification claims by controlling for the debate text in a high-dimensional semiparametric inference framework, thus blocking several confounding causal pathways. We estimate that a ten unit increase in credibility could amount to 40% of the effect of a percentage-point increase in argumentation skill. Patterns in the effect heterogeneity reveal how content characteristics of the persuasive message may influence the weights placed by persuasion targets on the heuristic and systematic pathways. Our findings can be leveraged by firms and conversational agents engaged in persuasion, such as when influencing voters, soliciting donations or mitigating customer churn.

Presentation 2 **Artificial Intelligence Advertising Agent: Ad Targeting While Learning**
Han Chen, Xueming Luo, Haizhong Wang, Jiaolong Xue, Temple University, Philadelphia, PA
Abstract: Traditional advertisers reiterate marketing campaigns to learn the optimal targeting policy. Artificial intelligence (AI) is revolutionizing the field by automating ad creative design and learning the optimal targeting policy on the fly under budget constraint. This paper seeks to propose such an AI ad agent (AIAD) with contextual multi-armed bandit (CMAB) methods. It adaptively allocates impressions to each ad creative targeting different customers. We test the AIAD on a dataset of over 30,000 ad campaigns run on Alibaba. Each campaign involves different ad creatives (e.g. emotion laden), with diverse contexts of visual features (e.g. color) and customer targeting attributes (e.g. click behavior). We employ a Doubly Robust estimator with Linear UCB and Thomson Sampling algorithms in parallel simulations. Results suggest that under the optimal ad policy, AIAD uplifts click rate by 40 times compared to conventional econometric models, and by 33.2% relative to MAB methods without learning. Our proposed AIAD has implications on AI advertising and adaptive learning for optimal customer targeting.

Presentation 3 **Counterfactual Demand Predictions with Deep Learning**
Mingyu Joo[1], Dong Soo Kim[2], Chul Kim[3], Hai Che[1], [1]University of California-Riverside, Riverside, CA, [2]The Ohio State University, Columbus, OH, [3]Baruch College, New York, NY
Abstract: This paper proposes a hybrid approach to estimating demand with rich observational information and predicting counterfactual outcomes combining deep neural nets with microeconomic theory. Two theoretical assumptions, functional-separability and quasi-homotheticity, decompose price response and demand shifter into separable functions in a linear expenditure share curve. In doing so, the causal component, price response, can take a separate, flexible functional form from the predictive component, demand shifter, offering a framework that machine learning methods can enhance predictive performance of each component. The proposed theoretical decomposition leads to a novel identification strategy of seasonal demand shifters - minimum expenditures spent within a category/season - that alleviates endogeneity concerns from unobserved confounds (i.e., seasonal pricing) in the absence of good instruments. Synthetic data analyses show that the proposed method provides with stable predictive demand curves with respect to counterfactual price points that have not implemented before, and is robust to correlated demand and price shocks.

Presentation **Session Chair**
Mingyu Joo, University of California-Riverside, Riverside, CA

Session TD02 **Digitization 5: Experiments**
02
12:45 PM - 1:45 PM

Presentation 1 **Subscription Contracts and Consumer Dynamic Decision-making: A Large-scale Field Experiment**
Avner Strulov-Shlain[1], Klaus Miller[2], Navdeep Sahni[3], [1]University of Chicago, Chicago, IL, [2]Goethe University, Frankfurt, Germany; [3]Stanford University, Stanford, CA
Abstract: The existence of consumer inertia - the tendency to remain passive and opt for the default behavior - is well-documented, and it is considered to be an important factor predicting consumer choice in wide range of contexts. Yet less is known about optimal policy of firms facing inert consumers, because inertia's source, magnitude, and how well do consumers account for it in their decisions are not well understood. While passive consumers may not respond to changing service terms, they may reduce their initial take-up if they account for their inertia. For many marketing applications, that is the hardest barrier to cross. Because of the lack of good data the total effect of inertia (initial take-up plus long-run behavior) on firm policy has not been studied. We overcome these challenges with a large-scale field experiment spanning a total of 3M potential subscribers of a large European newspaper. In a between-subjects design we vary whether subscriptions automatically-renew or cancelled after a promotional period, along with varying prices and durations of that period (keeping post promotional terms fixed). Along with subscription paths for different contracts, we observe the long-term usage of our experimental sample. Even though auto-cancel subscribers are encouraged to renew, subscribers in the auto-renewal contract are 4.3 times more likely to remain subscribed long after the promotional period ends; at the same time, the auto-renew contracts reduce initial take-up by 30%. Taken together, these effects suggest heterogeneity in sophistication as some consumers predict their inertia while others do not. We aim to distinguish between different models generating consumer inertia.

Presentation 2 **The Engagement-Diversity Connection: Evidence from a Field Experiment on Spotify**
David Holtz[1], Benjamin Carterette[2], Zahra Nazari[2], Henriette Cramer[2], Sinan Aral[1], [1]Massachusetts Institute of Technology, Cambridge, MA, [2]Spotify, New York, NY
Abstract: It remains unknown whether personalized recommendations increase or decrease the diversity of content people consume. We present results from a randomized field experiment on Spotify testing the effect of personalized recommendations on consumption diversity. In the experiment, both control and treatment users were given podcast recommendations, with the sole aim of increasing podcast consumption. Treatment users' recommendations were personalized based on their music listening history, whereas control users were recommended popular podcasts among users in their demographic group. We find that, on average, the treatment increased podcast streams by 28.90%. However, the treatment also decreased the average individual-level diversity of podcast streams by 11.51%, and increased the aggregate diversity of podcast streams by 5.96%, indicating that personalized recommendations have the potential to create patterns of consumption that are homogenous within and diverse across users, a pattern reflecting Balkanization. Our results provide evidence of an "engagement-diversity trade-off" when recommendations are optimized solely to drive consumption: while personalized recommendations increase user engagement, they also affect the diversity of consumed content. This shift in consumption diversity can affect user retention and lifetime value, and impact the optimal strategy for content producers. We also observe evidence that our treatment affected streams from sections of Spotify's app not directly affected by the experiment, suggesting that exposure to personalized recommendations can affect the content that users consume organically. We believe these findings highlight the need for academics and practitioners to continue investing in personalization methods that explicitly take into account the diversity of content recommended.

Presentation **Session Chair**
David Holtz, Massachusetts Institute of Technology, Cambridge, MA

Session TD03 **Game Theory: Platforms II**
03
12:45 PM - 1:45 PM

Presentation 1 **Paywalls With Consumer Satiation**
Chutian Wang, Bo Zhou, Yogesh V. Joshi, University of Maryland, College Park, MD, Contact: chutian.wang@rhsmith.umd.edu
Abstract: Paywalls are increasingly used by digital media as an effective tool for generating subscription revenues, but media firms need to balance these gains against potential losses in content consumption and advertising revenues. Further, consumers of digital content are often heterogeneous in their valuation as well as rate of satiation with media, which can have an impact on the content they choose to consume. We build an analytical model that endogenizes a consumer's content consumption decision in the presence of heterogeneity in consumer valuation as well as satiation, and analyze its impact on media firms' paywall strategies. We derive three key insights. First, heterogeneity in valuation alone is not sufficient for the existence of metered paywalls; however, the presence of even discrete levels of heterogeneity in consumers' rate of satiation can help explain their existence. Specifically, a metered paywall is the equilibrium strategy when advertising rates are moderate and the difference between consumers' rates of satiation is high. Under moderate advertising rates, the firm's trade-off between free content for advertising gain against price reduction for subscription demand gain is nuanced; such that free content is more effective than price reduction when the difference between the rates of satiation is high. Second, when this difference between distinct consumer segments' rates of satiation is moderate, the amount of free content offered varies non-monotonically with the advertising rate, since the firm's need to balance impressions generated from distinct consumer segments drives its provision of free content. Third, changes in satiation lead to two interesting effects: an increase in the proportion of consumers with a higher rate of satiation causes the firm to rely more on advertising rather than subscription, and the resulting price reduction has a positive externality on subscribers; while an increased difference in the rates of satiation causes the firm to focus more on subscription revenues via a higher price, and hence has a negative externality on subscribers.

Presentation 2 **Compensating Online Content Producers: A Theoretical Analysis**
Kun Qian[1], Sanjay Jain[2], [1]University of Texas at Dallas, Richardson, TX, [2]University of Texas at Dallas, Richardson, TX, Contact: kxq170030@utdallas.edu
Abstract: The digital content industry is rapidly growing and many platforms host vast amount of content that is produced by independent producers. A major source of revenue for these platforms is advertising. However, advertising revenue depends on the number of active consumers on the platform. Therefore, major platforms provide incentives for content producers to encourage high quality content. A commonly used incentive is ad revenue sharing. In this paper, we study how such sharing incentives are affected by the nature of competition among various producers and the degree of consumers' platform loyalty. We also examine the implications for profits and welfare and extend the analysis to consider the case when the platform allows consumers to directly donate to the producers. Our results show that increased producer competition can lead to higher compensation for the producers, higher content quality, and higher producers' profits. We also show that allowing consumers to donate to producers can lead to a higher commission rate and better quality content. However, increased consumer generosity may lead to lower profits for content producers. Our analysis of platform competition suggests that increased platform competition can lead to lower quality content and reduce consumer surplus.

Presentation 3 **Incentivizing Mass Creativity: An Empirical Study Of Online Novel Market**
Xiaolin Li[1], Mengze Shi[2], **Clarice Zhao**[2], [1]London School of Economics and Political Science, London, United Kingdom; [2]University of Toronto, Toronto, ON, Canada.
Abstract: Digital platforms like YouTube have enabled an unprecedented number of creators to publish and monetize their work online. This rise of mass creativity poses a new challenge: how should digital platforms manage the quantity and quality of mass creativity? We explore this issue using data from a leading online novel publishing platform in China, where contracted writers publish creative work online serially and readers pay to access (by chapters). The platform shares with contracted writers about 60% of their novel sales revenue and offers a quota-based bonus to incentivize their creative productivity. We build an analytical model to examine the writers' decisions in response to the bonus system, obtain equilibrium properties on the quantity and quality of creative work, and develop testable hypotheses on such writing behavior. We empirically test these hypotheses utilizing demand shocks to both the platform and individual writers in the online novel market. Our empirical results indicate that a quantity-based bonus system oered by a platform could improve the quantity of mass creativity without sacricing the quality. Moreeover, such incentive eects can become stronger when a new technology enhances digital consumption experience.

Presentation 4 **Quantity And Quality In A Video On-demand Service: An Analytical Exploration**
Nikhil George, Siddartha Sharma, Rahul Telang, Carnegie Mellon University, Pittsburgh, PA, Contact: ngeorge1@andrew.cmu.edu
Abstract: Entertainment programming today is being increasingly consumed via online services, commonly referred to as video on-demand (VOD) services. While a traditional TV channel requires its viewers to watch the same program at any given time, a VOD service provides the flexibility of watching any program offered, at a time of their choice. We develop a theoretical model in which viewers are heterogeneous in their preference for both *what* they watch and *when* they watch, and study how the quantity and quality of programs offered differ between a VOD service and a TV service. We illustrate how time flexibility affects the VOD service's decisions and show that, when the time preference of viewers is strong, the VOD service not only offers more programs than the TV service, but also offers at least as many programs of a higher quality.

Presentation **Session Chair**
Nikhil George, Carnegie Mellon University, Pittsburgh, PA

Session TD04 **How do Retail Assortment Size and Composition Influence Store Image, Store Choice, and Brand Choice? Review and Future Research Directions**

04

12:45 PM - 1:45 PM

Presentation 1 **Grocery Store Format and Their Impact on Customer Behavior**

Andre Bonfrer[1], Pradeep Chintagunta[2], Sanjay Dhar[2], [1]Deakin Business School, Burwood, Australia; [2]University of Chicago, Chicago, IL

Abstract: Customers are facing a fragmenting set of store formats from which to purchase packaged goods. The emergence and success of newer types of formats, such as "limited assortment" or "deep discounters" or a hybrid (e.g. Aldi, Lidl, Walmart, see Zhu et al 2009) has broadened bricks-and-mortar choices for consumers. Further, online shopping has been evolving to gain substantial penetration across all formats of traditional retailing. Together, these forces in turn have strong implications for traditional format retailers (mainly supermarkets, see Luchs et al 2014). This study aims to understand how retail formats have changed over the last few decades, based on a review of the literature coupled with empirical evidence drawn from the last two decades. A broad goal of this research is to understand the state of the body of knowledge - in particular, customer behavior and their responses to different formats' entry (e.g. see Singh et al 2006) and retailers' marketing activities (e.g. see Ailawadi et al 2010), as well as competitive conduct with respect to retail format. The research question that drives the review concerns the role of *retail format* in *Consumer Packaged Goods markets*, particularly focused on empirical or quantitative evidence that exists regarding *consumer behavior* and *competition*.

Presentation 2 **Behavioral Response to Price: Empirical Insights and Future Research**

Russell S. Winer[1], **Gurumurthy Kalyanaram**[2], [1]New York University, New York, NY, [2]City University of New York, New York, NY

Abstract: Pricing is probably the most important managerial decision making, marketing, and signaling instrument. Consumer response to company pricing policies remains an area of significant research interest. Scholarly research on consumer response to price has been conducted from a variety of disciplinary perspectives, including behavioral, economic, managerial and strategic. This paper will review the extensive extant research on reference price (Monroe 1971, Winer 1986) and related issues (such as Latitude of Acceptance by Sherif and Hovland 1961, Kalyanaram and Little 1994) of import and interest to scholars and practitioners, and present the empirical insights and generalizations offered in the research. Specifically, this paper will examine the following four areas of interest that have generated substantial empirical research and meta-analyses. • Reference price • Latitude of price acceptance/price thresholds/price range • Perception of fairness in pricing • Asymmetric responses to price increases and decreases, and to perceived unfairness and fairness in pricing We will also be identifying significant empirical findings in these research areas presented from the data from emerging economies. In this manner, we will examine for any material differences from the general empirical insights. Our search for empirical research findings will be interdisciplinary and eclectic (such as scholarly journals in behavioral science, social sciences, economics and marketing), though scholarly journals in marketing and related areas will be the most important constituent of our search. We will also be considering other academic publications such as research monographs, books, and MSI working papers. Based on our research thus far, we find that there are well-established empirical generalizations and more emerging generalizations which too offer keen managerial and research insights.

Presentation 3 **How do Retail Assortment Size and Composition Influence Store Image, Store Choice, and Brand Choice? Review and Future Research Directions**

Rajagopalan Sethuraman[1], Juan Carlos Gázquez-Abad[2], Francisco J. Martínez-López[3], [1]Southern Methodist University, Dallas, TX, [2]University of Almería, Almería, Spain; [3]University of Granada, Granada, Spain.

Abstract: Retail assortment, the portfolio of items (SKUs) that a retailer carries in a category, facilitates both convenience and choice. It is therefore an important strategic tool for a retailer to influence brand choice, store image, store choice, store switching, store traffic, and thus retail sales and profits. The broad empirical question we address in this review is: *How does retail assortment (size and composition) in consumer goods affect consumers' brand choice, store image, store choice, as well as retailers' sales and profits in both offline and online retail environment*? We draw on over 100 studies from past academic literature and present several empirical generalizations and future research directions related to the following specific questions in both physical and digital retailing: 1. How do consumers react to assortment reduction? In particular, do they develop a negative store image, switch stores, switch brands, or buy less quantity when fewer items are available on the shelf for purchase? 2. What is the magnitude of the effect of assortment size and composition on consumer choice, store switching, store sales and profits? 3. What consumer, category, structural, and environmental factors influence the assortment effects? In particular, do assortment effects vary by retail format (e.g., convenience stores, supermarkets, warehouse stores)? What is the role of private labels in the assortment portfolio? 4. How do consumers behave in online retail where they can dynamically select the assortment they wish to consider for purchase? 5. Are assortment size and composition less influential in store choice and revenues in online retail compared to brick-and mortar stores? 6. What are the implications of these findings for retail assortment planning?

Presentation **Session Chair**

Rajagopalan Sethuraman, Southern Methodist University, Dallas, TX

Session TD05 **Display Advertising**
05
12:45 PM - 1:45 PM

Presentation 1 **How To Overcome Online Banner Blindness? A Study On The Effects Of Creativity**
Qiang Yang, Jiale Huo, YUE XI, Yushi Jiang, Southwest Jiaotong University, Chengdu, China. Contact: yq@my.swjtu.edu.cn
Abstract: Creativity matters for attracting consumer attention. And in a web page context where banner blindness prevails, the design of banners becomes even more important in this respect. Given the prominence of banners in online marketing, it is also necessary to tap the potential of creativity of banner ads. This study aims to explore whether creativity can overcome banner blindness in the viewing of web pages, and demonstrate how visual saliency and banner-page congruity constitute the boundary conditions for creativity to improve memory for banner ads. Three studies were conducted to understand the influence of advertising creativity and banner blindness on recognition of banner ads, which were assessed using questionnaires and bias adjustment. Our findings suggest that creativity alone is not sufficient to overcome the banner blindness phenomenon. Specifically, in goal-directed tasks, the effect of creativity on recognition of banner ads is dependent on banner ads' visual saliency and banner-page congruity. Creative banners are high on visual saliency, and banner-page congruity yields higher recognition rates.Finally, we examine the theoretical contributions and managerial implications of our findings.

Presentation 2 **Empirical Evaluation Of Cost Of Annoying Ads**
Ayman Farahat[1], Joefish Kaye[2], Henriette Cramer[3], [1]Amazon, San Francisco, CA, [2]Mozella, San Francisco, CA, [3]Spotify, San Francisco, CA, Contact: ayman.farahat@yahoo.com
Abstract: Viewers often react negatively to advertising they view as unpleasant.In this paper, we show that this negative reaction is not confinedto the brand being advertised, but also effects the medium throughwhich that ad was delivered. Using data from three large scale naturalexperiments (N= 10M) on the Yahoo front page to evaluate both shortand long-term impacts of intrusive ads, we show that people activelyavoid Yahoo after being shown intrusive ads on our home page. We sawas much as 6% less traffic, searches and clicks from people shown intrusiveads, and showed that this reduction continues over sixty days. Weran a Mechanical Turk study to measure visitors' perceptions of ads,confirming that the ads different significantly in intrusiveness. We concludeby evaluating the long-term financial impact for Yahoo in termsof lost revenue, and contrast it with the advertising revenue, concludingthat current pricing for front page ads does not suitably take intoaccount the additional lost revenue from intrusive advertising.

Presentation 3 **Comparing The Effectiveness Of Retargeting And Acquisition Online Banner Ads: A Nonparametric Approach To Estimating Ad Stock**
Jangwon Choi[1], Fred M. Feinberg[1], Inyoung Chae[2], [1]University of Michigan, Ann Arbor, MI, [2]Emory University, Atlanta, GA, Contact: jangwonc@umich.edu
Abstract: This research examines how two different types of online advertising campaigns (i.e., acquisition and retargeting campaigns) affect online users' behaviors based on a Bayesian nonparametric approach, via Gaussian Processes, that regularizes over past ad weights in a flexible manner. Prior advertising works typically account for the cumulative effects of advertising through a latent "Ad Stock" construct. Even if each ad exposure does not elicit immediate reactions (e.g., store visits or purchases), it is presumed to build a "goodwill" that could lead to future response. Particularly, since the influential work of Nerlove and Arrow (1962), it has been assumed that the contribution of each ad decays exponentially over time at a constant rate estimated by a single parameter. In this research, we make use of an online panel of individual-level ad impression data for a French financial firm and online activity data of internet users who were shown its banner ads, allowing us to control for previous ad reactions and online browsing patterns. Our model is able to flexibly capture the differential impacts of acquisition and retargeting ads on website visits, both in terms of their initial impact on the day of exposure and their lingering effects over the data window. We show some initial evidence that the two types of ads do behave somewhat differently and that the traditional geometric decay assumption over-regularizes how the impact of ads evolves over time.

Presentation 4 **Placement Disclosure In Ad Auctions: Evidence From A Policy Change**
Sila Ada[1], Nadia Abou Nabout[2], **Elea McDonnell Feit**[3], [1]Vienna University of Business and Economics, Wien, Australia; [2]WU Vienna University of Economics and Business, Vienna, Australia; [3]Drexel University, Philadelphia, PA, Contact: eleafeit@gmail.com
Abstract: Ad exchanges, i.e., platforms where real-time auctions for ad impressions take place, have developed sophisticated technology and data ecosystems to allow advertisers to target users, yet advertisers often do not know which sites their ads appear on. In practice, ad exchanges can easily grant ad placement information to advertisers, allowing advertisers to bid on ads at specific sites. However, ad exchanges are reluctant to disclose placement information due to fears that advertisers will start buying ads only on the most desirable sites leaving inventory on other sites unsold and lowering average revenue. The theoretical literature on information disclosure in auctions suggests that auction revenue is a concave function of information provided and prices will fall when too much or too little information is provided about impressions. This paper explores the empirical effect of ad placement disclosure using a unique data set describing auction outcomes on a major European ad exchange. We find that average revenue per impression rises when ad placement information is provided suggesting that ad context information is important to advertisers. The exception to this are sites which had a low number of buyers prior to the policy change; consistent with theory, these sites with thin markets see prices go down. Our analysis adds evidence that publishers and ad exchanges with thick markets should provide advertisers with site placement information, which can be done at almost no cost.

Presentation **Session Chair**
Elea McDonnell Feit, Drexel University, Philadelphia, PA

Session TD06 **Social Media and Engagement III**
06
12:45 PM - 1:45 PM

Presentation 1 **When Does Brand Engagement Backfire? Group Social Engagement Breadth, Depth, And Timescale Impact On Consumption**
Keith Smith[1], Yakov Bart[1], Koen Pauwels[1], John Hulland[2], Scott Thompson[3], [1]Northeastern University, Boston, MA, [2]University of Georgia, Athens, GA, [3]St. Louis University, St. Louis, MO
Abstract: Data on brand engagement and its outcomes is increasingly collected by brands at a far greater volume and granularity than in the past, generating opportunities for increasingly sophisticated analysis. While brand engagement has been studied at the individual and market level, research at the group level is both more rare and more directly relevant to brand managers who make managerial decisions at the group level. Brand engagement at the group level is often intertwined with social interactions as customers interact with the brand and with each other. In such contexts social identity is likely to influence engagement behaviors and corresponding marketing outcomes, though these relationships are likely to vary based on certain dimensions of group engagement.
Utilizing a persistence-modeling framework, results across 33 branded products over the course of eighty three days collectively demonstrate that group social engagement has differential impacts on consumption depending on the breadth, depth, and temporal scale of group engagement. Further, there are contexts where group engagement behaviors can backfire and generate negative group brand consumption. These results illustrate despite the advantages of highly granular data, some phenomena in marketing take time to develop, and are likely to be missed without a proper assessment of the correct timescale for analysis.

Presentation 2 **Predicting The Success Of Social Media Marketing Campaigns**
Anthony Weishampel, **William Rand**, Ana-Maria Staicu, North Carolina State University, Raleigh, NC, Contact: wmrand@ncsu.edu
Abstract: Social media provides a far-reaching platform for campaigns of all types, including political and marketing campaigns, to quickly disseminate information and beliefs to a widespread audience. Savvy marketers and political influencers have been able to utilize these online platforms to successfully promote their product, brand, and image. However not all campaigns are successful in gaining traction and reaching their audience. Unsuccessful campaigns fail to spread their information and fade quickly. We present new methods to model marketing campaigns with the goal of identifying key components of the campaigns that led to success or failure.
The social media campaigns are modeled through a functional data analysis via a generalized Functional Principal Component Analysis. This model separates the campaign-specific variation from the mean trend, while accounting for additional covariate effects. In addition to accurately estimating the information diffusion of the topic, these methods result in statistics that can be used to classify and cluster the campaigns. When modeling the campaigns, single and multilevel scenarios are considered. For the single level functional approach, the campaigns are modeled through the mean and individual campaigns effects; whereas, in the multilevel methods repeated daily, weekly, and monthly effects are included in the models. All of these models provide statistics that are used as covariates in machine learning methods to identify successful and unsuccessful campaigns. In addition to the modeling and classifying the campaigns, the functional approach can identify time periods of importance for the success of the campaign. These time periods will be further investigated to detect influential accounts. In the end, we provide managerial insights into what aspects of a campaign make it more likely to succeed.

Presentation 3 **Online Brand Communities And The Interplay Of Structure And Strategy On Consumer-brand Relationships**
Gina Brynildsen[1], C. M. Sashi[2], [1]Sam Houston State University, Huntsville, TX, [2]Florida Atlantic University, Boca Raton, FL, Contact: gbrynildsen@shsu.edu
Abstract: The purpose of this research is to understand how the structure and interactivity of online brand communities affect the development of consumer-brand relationships. Through the lens of network theory, we create a typology of online brand communities on social networking sites and discuss the controls firms have over the interactivity of the community. Hypotheses are developed for the effects of the interactivity of the community on community interactions, and community interactions on relational exchange and emotional bonds. We test our model using an online survey distributed through Amazon Mturk and analyzed through PLS-SEM. The results suggest that firm decisions on the interactivity of the community affect both B2C and C2C community interactions, with a significantly greater effect for networks of following ties. Monitoring, delaying, or withholding communications was positively related with how consumers perceive both types of community interactions. Additionally, both B2C and C2C community interactions were positively related with relational exchange and emotional bonds. Brand and consumer interactions build stronger consumer-brand relationships when content is responsive, timely, relevant, and personal. This study contributes to the literature on online brand communities, interactivity, and relationship marketing by providing an organizing framework for the understanding and testing of different types of online brand communities. The results of our study should encourage practitioners to actively manage their online brand communities in order to boost consumer perceptions of community interactions and foster relationship development.

Presentation **Session Chair**
Gina Brynildsen, Sam Houston State University, The Woodlands, TX

Session TD07 **Choice Modeling III**
07
12:45 PM - 1:45 PM

Presentation 1 **Random-coefficients Logit Demand Estimation With Zero-valued Market Shares**
Joonhwi Joo[1], Jean-Pierre H. Dube[2], Ali Hortacsu[2], [1]University of Texas at Dallas, Dallas, TX, [2]University of Chicago, Chicago, IL, Contact: joonhwi.joo@utdallas.edu
Abstract: Abstract Although typically overlooked, many purchase datasets exhibit a high incidence of products with zero sales. We propose a new estimator for the Random-Coefficients Logit demand system for purchase datasets with zero-valued market shares. The identification of the demand parameters is based on a pairwise-differencing approach that constructs moment conditions based on differences in demand between pairs of products. The corresponding estimator corrects nonparametrically for the potential selection of the incidence of zeros on unobserved aspects of demand. The estimator also corrects for the potential endogeneity of marketing variables both in demand and in the selection propensities. Monte Carlo simulations show that our proposed estimator provides reliable small-sample inference both with and without selection-on-unobservables. In an empirical case study, the proposed estimator not only generates different demand estimates than approaches that ignore selection in the incidence of zero shares, it also generates better out-of-sample fit of observed retail contribution margins.

Presentation 2 **OPTIMAL RANKING IN DOUBLE INDEX SEARCH MODELS**
Giovanni Compiani[1], Greg Lewis[2], Sida Peng[3], Peichung Wang[3], [1]Haas School of Business, Berkeley, CA, [2]Microsoft, Cambridge, MA, [3]Microsoft, Redmond, WA
Abstract: We develop a model of consumer search and choice that is tractable and subsumes several commonly used search models. Consumers search in order of search indices to uncover utilities and stop whenever the highest uncovered utility exceeds the next search index. We posit that the ranking of products affects search, but not utility indices. Under this assumption, we characterize the ranking that maximizes consumer surplus and note that this may differ from the utility ranking. We propose a computationally convenient maximum-likelihood estimator for the utility and search parameters. We then illustrate the approach by applying it to data from Expedia. Our suggested ranking outperforms both the utility ranking and the ranking used by Expedia.

Presentation 3 **Learning Utility From Subjective Choice Probabilities**
Keyvan Dehmamy[1], Thomas Otter[2], Gunter J. Hitsch[3], Peter Kurz[4], Laura Schum[1], [1]University of Groningen, Groningen, Netherlands; [2]Goethe University Frankfurt, Frankfurt, Germany; [3]University of Chicago, Chicago, IL, [4]BMS - Marketing Research & Strategy, Munich, Germany.
Abstract: Choice-based conjoint analysis is a widely used method to estimate consumer preferences for products and services that are not currently available in the market place from survey responses. In a standard choice-based conjoint design, participants report their preferred choice among a set of alternatives. An assumption, borrowed from the analysis of revealed preferences, is that stated choices each maximize a participant's utility. Conditional on stated choices, the analyst then infers deterministic aspects of utility subject to assumptions about the distribution of utility aspects that only participants observed. The question of how to conceive of unobserved aspects of utility in a choice-based conjoint experiment remains unsettled. We propose and empirically test the possibility that participants may -- instead of constructing the utility maximizing alternative -- think about how likely alternatives are to be utility maximizing in the unobserved future where actually consequential decisions will occur. We thus allow participants to report choice probabilities instead of forcing them to make choices. We develop an analytical framework to infer utility functions from stated probabilities taking measurement aspects such as reporting errors and rounding into account, and develop the corresponding fully Bayesian inference. We find that the elicitation of choice probabilities is feasible and often more natural than forcing participant to make hypothetical choices. We also document efficiency gains and the potential for biased inferences when participants are encouraged to make choices, but choose alternatives that maximize expected utility instead of utility.

Presentation 4 **Investigating Marketing Effects On Voting Preferences And Turnout During The 2016 Presidential Campaign**
Simha Mummalaneni, University of Washington, Seattle, WA, Contact: simha@uw.edu
Abstract: During the 2016 United States presidential election, over a billion dollars was spent on marketing activities such as advertising, campaign rallies, and get-out-the-vote efforts. We investigate how this type of political marketing affects people's voting preferences as well as their decision to actually cast a vote. We focus on a nationally representative panel during 2016 in which survey respondents were repeatedly asked about their preferences and likely voting behavior regarding the presidential election. The panel structure of this data allows us to measure changes in each individual person's preferences over time. We decompose these effects into marketing and non-marketing effects by exploiting geographic variation in the level of political marketing that respondents were exposed to: people living in "toss up" states were exposed to a great deal of marketing activity, while people living in "safe" states received very little. Our results indicate that marketing efforts during the 2016 presidential campaign had little effect on people's preferences between the candidates, but they did have a more sizeable effect on people's decision to actually cast a ballot.

Presentation **Session Chair**
Simha Mummalaneni, University of Washington, Seattle, WA

Session TD08 **Games and Gaming Platforms II**
08
12:45 PM - 1:45 PM

Presentation 1 **Eyes On The Game: Eye-tracking Analysis Of The Beer Game**
Andres I. Musalem[1], Juan Pablo Torres[2], Rene San Martin[3], [1]Ing.Ind. U. de Chile, Santiago, Chile; [2]Universidad de Chile, Santiago, Chile; [3]Universidad Diego Portales, Santiago, Chile.
Abstract: The beer distribution game is a simulation game designed to illustrate the complexities of inventory decisions within a supply chain. We consider a simplified version of the beer game and use eye-tracking to study the attentional patterns of players. This allows us to study differences between good and bad players in terms of the attention they allocate to the different pieces of information (e.g., initial inventory, demand). We are also able to study differences in attentional strategy depending on the context faced by the players (i.e., positive initial inventory versus backorder).

Presentation 2 **An Empirical Study Of The Role Of Franchise Experience In Video Game Adoption**
Omid Elmi[1], Mina Ameri[2], Ying Xie[3], [1]University of Texas at Dallas, Dallas, TX, [2]University of Pittsburgh, Pittsburgh, PA, [3]University of Texas-Dallas, Richardson, TX, Contact: elmi@utdallas.edu
Abstract: Franchising has become a popular trend in the entertainment industry such as movies and video games. Firms primarily develop franchised games to exploit the pre-awareness and established user base of these types of games. However, there are many examples of unsuccessful franchised games, suggesting that whether this practice leads to more sales of games is still an open empirical question. In this paper, we empirically investigate the factors that influence an individual's adoption of a video game using data from *Steam*, the largest digital distribution platform for PC video games. We observe users' video game adoptions and consumption behaviors for nine months. Besides that, we also collect information on pricing and community feedback for video games. Utilizing a panel Logit model, we quantify the effects of users' adoption of previous games in the same franchise and their respective consumption experience of those games on their adoption of a new video game while controlling for community feedback and pricing of the game.

Presentation 3 **Exploring The Causal Effects Of Marketing Events - An Application To Exhibition Games In Soccer**
Georgios Nalbantis, Tim Pawlowski, University of Tübingen, Tübingen, Germany. Contact: georgios.nalbantis@uni-tuebingen.de
Abstract: While marketing events are considered to be a powerful communication tool for companies, empirical evidence assessing their effectiveness is scarce. This paper contributes to the literature by monetarily evaluating a particular marketing event strategy followed by professional sports teams around the globe in order to expand in international markets, that is, overseas pre-season tours. In a first study, we utilize a panel of representative survey data containing soccer-interested US respondents and implement a difference-in-difference (DID) design. The outcome variable is based on respondents' statements about their willingness-to-pay (WTP) for English Premier League (EPL) add-on subscription packages before and after the exhibition games took place. By making use of information on the respondents' residence and the location of the stadiums where EPL exhibition games took place, binary treatment variables were generated measuring whether or not a respondent lives within a certain radius of miles around the hosting stadium. To estimate the effect of interest, we employ a radius matching estimator based on the propensity score which conditions on socio-demographic variables that are expected to jointly determine the WTP and the locational choice of individuals. Results indicate positive effects of exhibition games on the WTP of residents living closer to a hosting stadium. Several placebo tests and further sensitivity checks denote the robustness of these findings. In a second (ongoing) study, we replicate our analysis in the same setting using game-by-game Nielsen TV ratings of EPL games in the US.

Presentation 4 **Entertainment Goods Competition with Busy Consumers: Video Game Usage under Time Constraints**
Rachel Wu[1], Yufeng Huang[1], Nan Li[2], [1]University of Rochester, Rochester, NY, [2]Tongji University, Shanghai, China.
Abstract: The recent decade has witnessed great explosion in both demand and supply of the entertainment goods. As time is a scarce resource and consumers have to cap content usage subject to time constraints, competition among different content in the usage stage becomes a first-order consideration for business decisions. In this paper, we exploit a granular data set on consumer game purchases and usage with ample variations in prices and product availability. We develop a two-stage model which captures the substitution among different content in both purchase stage and usage stage due to time constraints. Based on the demand estimates, we compare consumer usage patterns and game adoption rates under alternative platform designs using counterfactual simulation, and conclude with our suggestions on the platform design in the entertainment goods industry.

Presentation **Session Chair**
Rachel Wu, University of Rochester, Rochester, NY

Session TD09 **Visual Analytics**
09
12:45 PM - 1:45 PM

Presentation 1 **Causal Inference with Reinforcement Learning: A Novel Observational Approach**
Srinivas Tunuguntla, Neeray Arora, University of Wisconsin-Madison, Madison, WI
Abstract: In this paper, we introduce a framework based on Markov Decision Processes (Sutton and Barto 2018) for causal measurement in a large class of problems common to policy decisions. We consider settings where a decision-making agent makes sequential decisions to choose actions or interventions, that are endogenous, in order to achieve an objective. Our framework is fairly general, and can be used to conduct counterfactual analyses across fields such as marketing, finance, healthcare, and education. We develop an estimation method based on Reinforcement Learning to estimate outcomes under counterfactual policies, and measure the effect of individual actions within a policy. In marketing this approach can be applied to the class of attribution problems where the goal is to uncover the causal impact of different types of promotions in order to guide efficient resource allocation. We illustrate how the proposed method can be applied in practice in an empirical context involving display advertising. Causal measurement of display ad campaigns using observational methods presents a significant challenge because of small effect sizes and the selection biases induced by targeting (Lewis and Rao 2015). Using the proposed framework, we develop an observational method that recovers the incremental lift in outcomes attributable to (1) a display advertising campaign and (2) the individual impressions served.

Presentation 2 **Leveraging the Power of Images in Managing Product Return Rates**
Daria Dzyabura[1], **Siham El Kihal**[2], John R. Hauser[3], Marat Ibragimov[4], [1]New Economic School, Moscow, Russian Federation; [2]Frankfurt School of Finance & Management gGmbH, Frankfurt am Main, Germany; [3]MIT, Cambridge, MA, [4]MIT, Cambridge, MA
Abstract: 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, direct experiments are not feasible because the fashion season is over before sufficient data are observed. We show that predicting return rates prior to product launch enhances profit substantially. Using data from a large European retailer (over 1.5 million transactions for about 4,500 fashion items), we demonstrate that machine-learning methods applied to product images enhance predictive ability relative to the retailer's benchmark (category, seasonality, price, and color labels). Custom image-processing features (RGB color histograms, Gabor filters) capture color and patterns to improve predictions, but deep-learning features improve predictions significantly more. Deep learning appears to capture color-pattern-shape and other intangibles associated with high return rates for apparel. We derive an optimal policy for launch decisions that takes prediction uncertainty into account. The optimal deep-learning-based policy improves profits, achieving 40% of the improvement that would be achievable with perfect information. We show that the retailer could further enhance predictive ability and profits if it could observe the discrepancy in online and offline sales.

Presentation 3 **Brand Faces: Mining Brand Preferences from Consumer Faces**
Jochen Hartmann[1], Verena Schoenmueller[2], Yonat Zwebner[1], **Jacob Goldenberg**[3], Oded Netzer[4], [1]University Hamburg, Hamburg, Germany; [2]New York, NY, [3]Interdisciplinary Center (IDC) Herzliya, Herzliya, Israel; [4]Columbia University, New York, NY
Abstract: Communication among various stakeholders such as individual consumers and firms is becoming increasingly visual. While extant marketing research employing automatic analyses of unstructured data has mostly focused on texts, recently researchers have started to explore the information contained in images. For centuries, philosophers, researchers, and practitioners have been fascinated by the information contained in faces and conveyed by facial expressions. This research investigates brand faces. Specifically, we propose a novel multi-method approach to extract consumers' brand preferences from the characteristics of the facial cues of these consumers as reflected by their digital self-portraits on social media. While faces have already been used to successfully predict names, sexual orientation, and political affiliation, brand preferences pose a promising and managerially relevant challenge. To preempt possible privacy concerns, we abstract from individual faces and explore the face-brand link from an aggregated perspective. For both faces and brand preferences we create dense low-dimensional embeddings. Using a combination of the latest face representation, high-dimensional visualization, and clustering techniques (e.g., UMAP and t-SNE), we can (a) produce meaningful market maps that can be derived solely from facial features, (b) cluster brands that target similar consumers, and (c) reveal insightful associations between facial features and brand preferences. Our data comprise more than 100 brands across a diverse set of sectors, enabling us to create generalizable findings for the possibilities of automated brand audience analytics.

Presentation 4 **Is a Picture Worth 100 Reviews? The Role of Profile Pictures in Online Labor Marketplace**
Lan Luo, **Isamar Troncoso**, University of Southern California, Los Angeles, CA
Abstract: Freelancing websites have gained tremendous popularity in recent years, connecting millions of businesses and independent professionals or freelancers all around the globe. We investigate how employers on such platforms make tradeoffs between freelancers' reputation (e.g., number and ratings of reviews; certifications) and their profile pictures on their hiring choices. Our empirical setting is based on one of the world's largest freelancing websites, from where we collect data from all jobs posted between January and June 2018 then ended with a winner, adding up to 79,038 projects with 220,385 freelancers applying for them. We use computer vision methods to extract profile pictures-related information, such as perceptions of the candidates' job fit. We then use a conditional logit model to estimate the probability of being hired as a function of reputation variables, bidding variables (e.g., price), and profile pictures-related variables. Our results suggest that profile pictures-related variables have a significant effect on hiring outcomes, even after controlling for reputation and bidding variables. Because our observational data is subject to potential supplier-side bias, we further conduct several conjoint-like eye-tracking studies to explore: 1) how consumers process and make tradeoff between reputation, bidding variables, and profile pictures; 2) how these tradeoffs change depending on how the platform displays the profile pictures (i.e., with, without, and after one click). Our research is among the first to explore the role of profile pictures in online labor markets. It offers useful implications for freelancer platforms regarding whether and how to present profile pictures such that potential hiring biases may be mitigated.

Presentation **Session Chair**
Lan Luo, University of Southern California, Los Angeles, CA

Session TD10 **Branding**
10
12:45 PM - 1:45 PM

Presentation 1 **Distribution Intensity And Brand Equity For Luxury Goods**
Xinyu Chen[1], Frazier Gary[2], [1]Huazhong Agriculture University, Wuhan, China; [2]University of Southern California, Los Angeles, CA, Contact: xc_730@marshall.usc.edu
Abstract: How distribution intensity affects consumers' perception of brand equity is an important topic in the marketing discipline because it helps brands to add value. We use the transaction cost theory and scarcity theory to construct a conceptual framework that links distribution intensity through perceived brand availability and perceived brand exclusivity to brand equity. We collect four-round data across the whole U.S. and test model from luxury watch consumers. Results show that distribution intensity affects brand equity through perceived brand availability and perceived brand exclusivity. Specifically, number of stores and a firm website promotes brand availability, while number of stores inhabits brand exclusivity. Moreover, perceived brand availability and perceived brand exclusivity drive brand equity. These findings offer the insight into the relationship between distribution intensity and brand equity, and provide useful guidance on how firms should take the specific distribution strategies in a multichannel context.

Presentation 2 **Well-known Vs. Well-liked - Empirical Regularities About Brand Awareness And Image Observed Across 1,578 Brands Over 5 Years**
William Shibuya[1], Rex Yuxing Du[2], [1]University of Houston, Houston, TX, [2]University of Houston, Houston, TX, Contact: wshibuya@uh.edu
Abstract: Which patterns exist in brand awareness and brand image that could be considered as empirical regularities to help firms build their brand equity? This article analyzes data that tracked the awareness and image of 1,578 brands, in 43 sectors, for a period of five years, broken down by gender and age groups. One of the more interesting findings indicates that brand awareness is a double-edged sword, with positive and negative outcomes for brand image. An increase of one percentage point in brand awareness corresponds to increases of 0.2 percentage point in positive brand image, and 0.1 in negative brand image. This implies that, as brands become better-known, they should expect not only to be better-liked among those aware of their brands but disliked by them, too. Results also suggest that brand managers must remain vigilant about the volatility of younger people, as consumers in that segment exhibited a more polarized view of brands, with both positive and negative brand images being more extreme than those found among older consumers.

Presentation 3 **Digital Storytelling And Brand Engagement**
Ke Li[1], Zach Luse[2], [1]Keene State College, Keene, NH, [2]Paragon Digital Marketing, Keene, NH, Contact: ke.li@keene.edu
Abstract: With frequent communications between companies and their customers in the digital era, content marketing has gained more importance than ever. Since people usually think more narratively than argumentatively and archetypally, storytelling is essential for companies to increase brand awareness, to engage customers and to build brand loyalty. In this study, we explore how different types, formats, structure and content of storytelling affect customers' engagement and information retention in different marketing communication channels such as newsletter, blog and social media through A/B testing. Particularly, we examine how company's storytelling evokes customer sharing of their emotion and own experience from which they develop deep tie with the brand. Our study helps companies to share their brand story, to better connect with their customers, and to stand out in their industry.

Presentation 4 **Brand Resonance for Marketing Strategy**
Nagasimha B. Kanagal, Indian Institute of Management Bangalore, Bangalore, India.
Abstract: Brands and branding take products of firms to the consumer to satisfy the needs and wants of consumers through exchange processes that exhibit and accommodate value synergies in the market place and thereby satisfy aspects of firm objectives that include the provision of money through margin to the firm. The paper aims to delineate aspects of brand resonance, and methods of improving the ability of firm to improve the resonance of its brands. From a business perspective, it is a postulate of this paper that brand resonance is the ability of the brand to attempt synergistic effects in market outcomes with respect to the efforts of the firm in building, managing and selling brands. Ability to resonate a brand can be effectively improved when marketing strategists attend to the strategic aspects of brand resonance as well as make appropriate judgments about brands and branding; these include firm orientation alignment, value orientation alignment, market orientation alignment, industry orientation alignment, business environment orientation alignment, leadership brand alignment, and inter-orientation alignment. Further brand resonance is influenced by the impact and interactivity of brands and branding with functional and / or value management strategies; towards this end, a latent variable path for extended functionality (functionality is considered for the purpose of this study as a usage-specification translation construct) is proposed. Implications for marketing strategists are laid out.

Presentation **Session Chair**
Nagasimha B. Kanagal, Indian Institute of Management Bangalore, Bangalore, India.

Session TD11 **Laboratory Insights Into Consumer Behavior**
11
12:45 PM - 1:45 PM

Presentation 1 **How Variety Influences Predictions Of Future Goal Conflict**
Luis Abreu, Sarah Memmi, Jordan Etkin, Duke University, Durham, NC, Contact: luis.abreu@duke.edu
Abstract: When pursuing goals, how do consumers use information about conflict in the past to make judgments about (and thus prepare for) conflict in the future? We suggest that variety may play a key role. Six experiments demonstrate that perceiving greater variety in past episodes of goal conflict (e.g., past failures to save money for the future or to attend a gym class to stay fit) leads people to forecast less goal conflict in the future. This occurs because variety interferes with pattern recognition, causing people to view past events as disconnected (and therefore less likely to recur). We find support for these predictions across different goal domains using a combination of self-reported personal goals and conflicts (experiment 1), controlled laboratory tasks (experiment 2), and stylized scenarios (experiments 3a-b, 4, and 5). Experiment 4 suggests that this effect is robust to non-motivational past conflicts (i.e., interfering events outside the control of the consumer), a common characteristic of consumption goals. Experiment 5 also demonstrates downstream consequences for the uptake of goal-protective actions that promote goal adherence. The findings contribute to the understanding of goal conflict, variety, and future events forecasting.

Presentation 2 **Consumers as an Avoidance Group for Service Providers: Outcomes for Consumers' Experience and Adoption of a Common Ingroup Identity**
Frank Cabano[1], Elizabeth Minton[2], [1]University of Texas- El Paso, El Paso, TX, [2]University of Wyoming, Laramie, WY, Contact: fgcabano@utep.edu
Abstract: The behaviors of consumers are often motivated by the desire to avoid association with social identities that are perceived to be undesirable to the self. Indeed, there is a large body of research that reveals that consumers often take actions to avoid being associated with conflicting social identities, or avoidance groups. In the current research, we ask might service providers also behave in ways to avoid being affiliated with such groups? And how does this affect consumers in the marketplace? The current research investigates these theoretical questions in the substantive domain of the ongoing marketplace inclusion versus religious freedom conflict. We chose this context because currently the United States is witnessing a showdown between LGBT advocates and some religious groups regarding the right of service providers to discriminate in their service behavior toward LGBT consumers. Notably, we also argue that our conceptual model is applicable to any marketplace transaction in which a service provider interacts with a consumer from an avoidance group (e.g., a Muslim serving a Christian, a Patriots (NFL) serving a Steelers fan, etc.). Across five studies, we document four major findings. First, we show that identity salience causally reduces service quality intentions of service providers to consumers from avoidance groups. Second, we highlight multiple boundary conditions to this effect, such that service quality intentions are lowered when service involvement is high (vs. low) or when the service provided is identity-invoking (vs. not). Third, we demonstrate that social identity threat perceptions mediate the negative effect of conflicting social identities on service quality intentions. Finally, we provide evidence for the common ingroup identity model (i.e., instructing participants to focus on the commonalities between themselves and others) as an intervention strategy that reduces social identity threat perceptions associated with serving consumers from avoidance groups, thereby enabling positive service quality intentions and marketplace inclusion.

Presentation 3 **Hidden Benefits Of Hiding The Best Option: Perceived Effort Payoff In Search**
Elina Y. Hur[1], Kaitlin Woolley[2], Yanping Tu[3], [1]Cornell University, Ithaca, NY, [2]Cornell, Ithaca, NY, [3]University of Florida, Gainesville, FL
Abstract: When presenting a set of products for consumers to search through, marketers often present the best product earlier (vs. later) to attract attention and make the search process efficient. However, seven studies demonstrated that presenting the best option *later* in a finite set offers benefits to marketers and consumers. Consumers searching for hotels, restaurants, and apartments felt that the effort they put into search paid off more, that is, was well spent and worthwhile, when they found the best option late (vs. early) in a search sequence. This increase in perceived effort payoff mediated the effect of presentation order on increased valuation of the chosen option. Consumers indicated: (1) greater commitment to purchase the selected option, (2) greater willingness to pay for the option, and (3) greater willingness to recommend the option to others when the best option was presented late (vs. early). Examining our proposed process, we find that this effect is driven by perceived sense of progress in searching for the best option. We test the progress pathway through moderation (simultaneous vs. sequential search) and through mediation (measuring perceived progress). Our research theoretically contributes to research on consumers' search behavior, finding that consumers derive utility from their effort during search, which impacts their valuation of the chosen option. We further offer new insights to marketers, as displaying products early may not always be the best way to optimize product presentation in online and offline markets. Overall, we offer a novel perspective for understanding search process with respect to perceived effort payoff, a process underexplored by previous research on consumer decision making.

Presentation 4 **Does It Pay To Offend: Short And Long Term Reactions For Offensive Advertisements**
Enav Friedmann, Eliran Solodoha, Ben Gurion University, Beer Sheva, Israel. Contact: enav.friedmann@gmail.com
Abstract: Our paper elucidates the effects of offensive-stereotyping advertisements on purchase intentions and sales, which to date has mainly shown negative effects on sales. Using two experimental studies where race and gender groups were offended, we found that airing offensive ads predicted a positive trend in sales over time, consistent with a field study of Goldstar beer. In the first experiment exposure to offensive ad had a positive effect on purchase intentions over time, in the second experiment, exposure to offensive ad had a positive effect on actual choice. These effects were not evident in the control conditions. We termed this as "The Offensive Paradox" (TOP) effect. TOP was amplified when examining discriminated groups: those groups had a larger increase in purchase intentions over time than the non-discriminated groups. TOP was not positively related to increased brand awareness but rather caused by power motivations as the compensatory consumption and the power approach theories predicted. In the long-term, discriminated individuals who felt less identified with their low-power group, had a more positive consumer response (purchase intentions, actual choice) toward the brand that offended them than the non-discriminated groups. The discriminated individuals wanted to avoid low power associations, as lower identification with their group, led to more positive consumer response. Practically, we hope these new insights will raise ethical concerns for marketers, minimizing the use of offensive ads. Currently, these ads are mainly regulated by consumer complaints to self-regulatory bodies. We suggest forming specific regulations regarding their use, to make the offensive firms liable for reinforcing negative stereotypes to promote sales. Limiting the use of such advertising might contribute to a better world.

Presentation **Session Chair**
Enav Friedmann, Bar Ilan University, Omer, Israel.

Friday, June 12, 2020
Session "FA"
9:00 AM - 10:00 AM

FA01. NO SESSION

FA02. Text and Sentiment Analysis

FA03. Game Theory: Behavioral Economics

FA04. Stores and Retailing

FA05. NO SESSION

FA06. Social Dynamics on Online Platforms

FA07. Sustainability and CSR

FA08. Platforms - Field Experiments

FA09. Strengthening Academia-Industry Collaborations: Ongoing research using data from Wharton Customer Analytics

FA10. Spatial and Distance Applications

FA11. Technological Advances in Education

Session FA01
01
9:00 AM - 10:00 AM

NO SESSION

Session FA02 **Text and Sentiment Analysis**
02
9:00 AM - 10:00 AM

Presentation 1 **A Machine Learning Algorithm For Personalized Feedback On Creative Appeals**
Jiyeon Hong, Paul R. Hoban, University of Wisconsin, Madison, WI
Abstract: We present a novel deep learning algorithm to provide personalized feedback on written creative appeals. The proposed approach classifies documents based on their expected probability of success, and produces a ranking of the sentences that incorporates both their centrality to the document's message and their impact on its outcomes. Using a series of recurrent neural networks, the approach leverages both the hierarchical structure of written works, associating words with sentences and sentences with documents, and the order in which these underlying components appear. Those sentences with the lowest rank are both important to the document's message and written in such a way as to negatively impact effects. For the author, these are the most effective points at which to focus for a revision. The immediate applications include any context in which a written document is evaluated and some reward assigned (e.g., crowdfunding appeals, RFP responses, and research grant proposals). We estimate the model on data from DonorsChoose.org, a donation-based crowdfunding platform for K-12 educators. On this platform, teachers craft proposals to fundraise for classroom projects. We show that the proposed algorithm is able to accurately predict the success of each appeal (i.e., whether it is fully funded) and identify the sentences most influential in that prediction. To provide a conservative estimate of the algorithm's potential, we examine the impact of deleting the sentences most negatively impacting proposal success, and find that the probability of success increases significantly. This serves as a lower bound on the potential benefit, as manual revision efforts would likely modify, rather than delete, problematic sections.

Presentation 2 **Product Embedding For The Large-scale Disaggregated Sales Data**
Yinxing Li, Nobuhiko Terui, Tohoku University, Sendai, Japan. Contact: yinxing.li.a8@tohoku.ac.jp
Abstract: As the development of big data analysis, disaggregated scanner panel data from stores have been analyzed for various purposes these years. Though these have been widely and successfully applied to understand individual customers and explore targeted or one-to-one marketing strategies, the interpretability for the large-scale market response is rarely discussed. In this research, we propose a framework for the big, sparse high-dimensional disaggregated store-level sales data based on the Word2Vec and Topic model. We see an individual customer as document, one receipt as a sentence, and one product as a sentence in Nature Language Process. Different from the Word2Vec and LDA2Vec proposed in the previous research, we extend our framework and vectorize each product not only based on the joint purchase information from a receipt, but also auxiliary information such as category, price information of product, which would extract more useful information with high interpretability in the marketing field comparing to the benchmark models. The topic model is applied to disaggregated data to decompose the daily receipt sales volume of a product into sub-sales for several topics by allocating each unit sale in a day into a topic based on joint-purchase information with hierarchical structure for the topic distribution parameter, which would interpret whether a purchase pattern is driven by customer himself, or driven by the marketing promotion. Our managerial implication shows useful insight for the store when they customize the promotion for individual customers.

Presentation 3 **Can AI Help in Crowdsourcing? Testing Alternate Algorithms for Idea Screening in Crowdsourcing Contests**
Jason Bell[1], **Christian Pescher**[2], Gerry Tellis[3], [1]University of Oxford, Oxford, United Kingdom; [2]FAU Erlangen-Nuremberg, Nuremberg, Germany; [3]Universiy of Southern California, Los Angeles, CA
Abstract: Crowdsourcing, while a boon to ideation, generates thousands of ideas. Screening these ideas to select a few winners is a major challenge because of the limited number, expertise, objectivity, and attention of judges. Artificial intelligence (AI) may help. This paper compares three original and extended versions of AI algorithms from marketing to evaluate ideas: Word Colocation, Content Atypicality, and Inspiration Redundancy. Each algorithm suggests predictors of winning ideas. The authors extend these predictors and apply two methods for finding parsimonious predictors: least average shrinkage and selection operator (LASSO) and K-sparse exhaustive search, for K<=5. The authors test the algorithms on 20 crowdsourcing contests conducted for large firms. The standard provided by the client is "drop the worst 25% of ideas without sacrificing more than 15% of good ideas," as ranked by experts. Results are the following. First, of the three original algorithms, Inspiration Redundancy performs best out-of-sample, but fails to meet the 15% threshold. Second, for two of the three algorithms, the extended versions outperform the original. In particular, Topic Overlap Atypicality, a new measure, emerges as the most robust predictor. Third, when the best versions of the algorithms are used, all three contribute to the important out-of-sample prediction accuracy.

Presentation 4 **Quantitative Analysis Of Cultural Changes In Values Using Millions Of Digitized Books**
Akihiro Inoue[1], Jin ZHANG[2], Pan HU[3], [1]Keio University, Yokohama-city, Japan; [2]Tsinghua University, Beijing-city, China; [3]Meituan, Beijing-city, China. Contact: ainoue@kbs.keio.ac.jp
Abstract: Culture changes over time can be revealed through cultural products such as books. The present study examines cultural changes using the Google Ngram corpus of millions of books in Chinese and American from 1900 and 2008. The lists of the words, representing the four dimensions of the values developed by Schwartz (2006), were selected from Linguistic Inquiry and Word Count (LIWC).
Schwartz proposes the four cultural dimensions (self-enhancement, openness-to-change, conservation, and self-transcendence). Based on the lists of the words by LIWC, we run the reliability analysis so as to get the lists of the words that are more reliable in terms of Cronbach Alphas and more concise. Then, we run the factor analysis with the one-factor restriction so as to get the unidimensional scores of the Hofstede's cultural dimensions. Next, we run the Granger causality test based on the four-dimensional VAR so as to infer the causal relationships among the four cultural dimensions for Chinese and USA data. First, we found the difference in the causal structures between China and USA. Regarding the USA data, we found the two causalities: self-transcendence causes openness-to-change and conservation causes self-enhancement, and the one negative mutual causality between openness-to-change and conservation. However, regarding the Chinese data, we found the three causalities: openness-to-change causes self-enhancement, self-enhancement causes self-transcendence, and conservation causes self-transcendence, and the one positive mutual causality between openness-to-change and conservation. Second, we found the changes in cultural causal structures in China among the three periods. Between 1900 and 1949, we found that openness-to-change caused conservation. Between 1949 and 1976, we found that conservation caused self-transcendence. Between 1976 and 2008, we found that conservation caused openness-to-change. We also examined another values developed by Hofstede (2001). We will show the results of the six-dimensions of Hofstede's values in the presentation.

Presentation **Session Chair**
Akihiro Inoue, Informs Account, Itami-city, Japan.

Session FA03 **Game Theory: Behavioral Economics**
03
9:00 AM - 10:00 AM

Presentation 1 **Forgetful Consumers With Consumption Tracking Costs**
Mengze Shi[1], Peter Landry[2], Ying Bao[2], [1]University of Toronto, Toronto, ON, Canada; [2]University of Toronto, Toronto, ON, Canada. Contact: mshi@rotman.utoronto.ca
Abstract: This paper examines the marketing implications of the advances in consumption tracking technologies. More specifically, we study how a firm would respond through its pricing decisions (including penalty fees) and whether the reduced consumption tracking cost would increase consumer attention to their transactions and reduce their penalty fees. Towards this end, we develop a two-period consumption model in which a firm offers a service contract that consists of a subscription fee and a penalty fee. Consumers must pay a penalty fee to the firm if they consume in both periods. Consumers can be "forgetful" in the sense that, upon reaching the second period, they may not perfectly remember whether they consumed in the first period. Moreover, while consumers are forward looking in the first period, they may not be "sophisticated" enough to perfectly anticipate the extent of their forgetfulness in the second period. Our analysis shows that if consumers do not have the option to track, the firm will charge a penalty fee, which is higher when consumers are less sophisticated. The availability of tracking option prompts the firm to reduce its penalty fee to disincentivize consumers from using it. Without such pricing adjustment, some consumers would track and avoid paying the penalty fees, and some other consumers would not join the service as they expect to track their consumption and have a lower willingness to pay for the service. In the equilibrium, it can be rational for consumers to be forgetful (do not track) and the penalty fees persist. These results confirm the importance for the firms and regulators to consider consumers' limited sophistication towards their forgetfulness in the pricing decisions on service contracts and policy decisions on tracking technologies. The paper also provides a new model of consumer sophistication and offers a theory to explain consumer's rational inattentive behavior through a firm's endogenous price adjustment in response to technological changes.

Presentation 2 **Alertness-Enhancing Consumption**
Peter Landry, University of Toronto, Toronto, ON, Canada. Contact: peter.landry@rotman.utoronto.ca
Abstract: This paper theoretically studies the (ubiquitous) consumption of "alertness-enhancing" products -- which help consumers allocate more time to productive (or otherwise utility-generating) waking activities -- and related dynamic aspects of sleep. The proposed model offers testable new predictions while capturing several empirical patterns unaddressed by existing theories, including "rebound" effects, partial intertemporal substitution of sleep, and the opposite associations of alertness-enhancing consumption and sleep with temporal discounting. New implications concerning the modern decline of sleep durations, the prevalence of irregular sleep schedules, and the effect of wages on sleep are also addressed.

Presentation 3 **Endogenous Norms As Constraints On Betrayal Of Trust**
Zuhui Xiao[1], George John[2], [1]University of Wisconsin-Milwaukee, Milwaukee, WI, [2]University of Minnesota, Minneapolis, MN, Contact: zuhuix@uwm.edu
Abstract: A vast literature in marketing and elsewhere contends trust facilitates norm-based economic exchange, even in atomized, reputation-less markets. However, extant trust theories provide a very limited account of norm-based constraints absent which trust would unravel. The popular calculative formulation of trust as a risky bet on counter-party trustworthiness also sits uncomfortably with strong experimental evidence that agents actually find it more difficult/costly to trust a human counter-party versus making an impersonal bet against nature given the same odds of success and failure. As such, the core empirical puzzle persists, viz., the co-existence of trust and betrayal. We model a trustor making an upfront payment (trust) to a trustee in anticipation of the trustee engaging in costly effort to complete a non-contractible task. Our principal innovation defines the norm as a jointly held endogenous stochastic distribution on the trustee's effort response obligation. The trustor and trustee hold rational expectations of monetary outcomes as well as emotional outcomes arising from betrayal and guilt respectively. Their decisions arise from evaluating these prospective outcomes relative to the stochastic references along prospect theory lines. In our solution, equilibrium trust and betrayal co-exist and develop interdependently. Higher trust induces higher effort response, improving performance, but simultaneously increasing the odds of betrayal because the norm-induced increase in effort is much slower than the concomitant increase in the reference distribution of the normative obligation. Several managerial ramifications of our formulation of normative restraints are developed, including the design of trust-enablement in impersonal, online settings.

Presentation 4 **Quality Disclosure Under Consumer Loss Aversion**
Krista J. Li[1], Jianqiang Zhang[2], [1]Indiana University, Bloomington, IN, [2]Jiangsu Normal University, Xuzhou, China. Contact: kjli@indiana.edu
Abstract: Consumers experience a sense of loss when a product's quality does not match their expectations. To alleviate consumer loss aversion (CLA), firms can disclose information to reduce consumers' uncertainty about product quality and the resulting psychological loss. In this paper, we investigate the implications of CLA on firm profit, consumer surplus, and social welfare when firms endogenously make quality disclosure decisions. We find that CLA leads symmetric firms to disclose quality more often. Given that CLA weakly reduces consumers' utility from buying a product and quality disclosure is costly, intuition suggests that CLA is detrimental to firms. We find that this intuition is only true in a monopoly. Surprisingly, CLA makes both firms in a competition better off. These effects are unique to CLA, while related emotion such as anticipated regret does not affect disclosure decisions or firm profits. Moreover, CLA increases firms' profit when they invest in quality disclosure instead of money-back guarantees to respond to CLA. We also find that CLA decreases consumer surplus and social welfare. Therefore, educating consumers to improve decision-making skills by deliberating on future outcomes and emotions can benefit firms at the cost of consumers and society. When firms disclose quality sequentially, CLA can discourage the follower from disclosing quality. A strong level of CLA increases the leader's profit over the follower's, thereby encouraging firms to be the first mover in quality disclosure.

Presentation **Session Chair**
Krista J. Li, Indiana University, Bloomington, IN

Session FA04 **Stores and Retailing**
04
9:00 AM - 10:00 AM

Presentation 1 **Beyond Showrooming: Category Expansion From Offline Stores**
Shuwen Jiang, Xing Li, Qiaowei Shen, Peking University, Beijing, China. Contact: jiangsw@pku.edu.cn
Abstract: Many online-first retailers have adopted omnichannel strategies to expand their territories from online to offline. In this paper, we seek to understand the function of offline showroom for multi-category online retailing platforms, which is relatively understudied. Using detailed transaction-level data along with in-store product scanning information from a major online retailing platform in China that introduced its first offline showroom during the data period, we identify a positive category expansion effect for the existing customers who visit the offline showroom using difference-in-differences approach. That is, a customer tends to purchase products from new categories that otherwise not purchased in the online environment, after visiting the offline showroom. Furthermore, we find evidence that (1) in addition to the physical display of the products in the showroom, sales people working onsite contribute to half the category expansion effect; (2) the effect is not a mere frenzy of impulsive purchase, and the showroom helps to better match customer needs with products; (3) the effect is smaller among experienced customers. Practical implications are discussed.

Presentation 2 **Constructing A Digital Transformation Framework For Dynamic Marketing Decision Support System For Fresh Food In Retailing**
Tsung-Yin Ou[1], **Chih-Ying Liu**[2], [1]National Kaohsiung University of Science and Technology, Kaohsiung City, Taiwan; [2]Graduate Program in Marketing and Distribution Management, Kaohsiung City, Taiwan.
Abstract: Owing to new technological advances, the customer's consumption behavior and retailers' business model has changed rapidly. Most retailers acknowledge that digital transformation will be unavoidable in the future, but there are still many managers who have not faced this issue. This paper aims to develop digital transformation framework which can identify of the questions, evaluation of the plan and supports retailers' decision-making with practical data of fresh food in retailing. Because the expiration date of flash food is short, the customer's daily demand and the reaction toward marketing planning are difficult to predict, this leads to waste of fresh foods in retailing every year. This study uses aforementioned framework to establish a dynamic marketing decision support system (DMDSS) by following the five stages.The first stage is business problem identification which focus on the waste of fresh food in retailing; The second stage is the goal identification, mainly to improve the sales forecast of fresh food and the reduction of scrap; The third stage is plan generation, using advanced artificial intelligence and data science to forecast the sales of fresh food and try to develop alternative promotion plans; The fourth stage is plan evaluation, using Monte Carlo simulation to analyze the sensitivity of decision variables such as discount range, timing of implementation and promotion strength; The final stage is plan implementation which aims to confirm the feasibility and benefits of different plans.The results show that data-oriented decision based on the framework proposed by this research can shorten the schedule to implement digital transformation in retailing. Regardless of what advanced AI prediction model is used, prediction errors exist inevitably. Facing the high degree of changing in demand for fresh food, a dynamic promotion plan should be formulated based on actual sale situation and real-time inventory. This study can reduce the scrap of fresh food in retailing notably and increase profits by 25% to 43% per day.

Presentation 3 **Antecedents And Consequences Of Cart Abandonment**
Karthik Sridhar[1], Ram Bezawada[1], Ashish Kumar[2], [1]Baruch College - The City University of New York, New York, NY, [2]RMIT, Melbourne, Australia. Contact: Karthik.Sridhar@baruch.cuny.edu
Abstract: Globally online retailers lose substantial revenue from customers abandoning online shopping carts after initiating checkouts. These customer actions lead to decreased loyalty and firm engagement in the long run. Our study using actual purchase data provides novel insights into this industry relevant issue by providing actionable strategies for curtailing abandonment and inducing cart recovery through a simple mechanism of reminder emails. For this purpose, we utilize a rich dataset comprising customer purchase behavior spanning multiple years and identify unique and relatively less researched explanatory variables. Additionally, we consider three distinct types of recoveries - full, major and minor - that manifest in case of abandoned carts and provide strategies for their successful recoveries. Although very managerially relevant, these different types of recoveries in relation to abandoned carts have not been investigated by prior research. We analyze the presence of popular items, payment mechanisms, cart value and customer recency and frequency factors in influencing abandonment, customer response to reminder emails and associated recovery. We model jointly cart abandonment, reminder email response and types of cart recovery while simultaneously controlling for self-selection bias. Our implications are important for online retail firms. We provide strategies that influence firm policy in curtailing cart abandonment; and also expands firm vision on the existence of different types of recoveries that can be used to salvage abandoned carts.

Presentation **Session Chair**
Karthik Sridhar, Baruch College - The City University of New York, New York, NY

Session FA05
05
9:00 AM - 10:00 AM

NO SESSION

Session FA06 **Social Dynamics on Online Platforms**
06
9:00 AM - 10:00 AM

Presentation 1 **Social Dynamics in Crowdsourcing: Imitation and Return on Originality in Online Design Contests**
Reto Hofstetter[1], Harikesh Nair[2], Sanjog Misra[3], [1]University of Lucerne, Luzern, Switzerland; [2]Stanford University, Stanford, CA, [3]University of Chicago Booth School, Chicago, IL
Abstract: Open innovation platforms that enable organizations to crowdsource ideation to parties external to the firm are proliferating. In many cases, the platforms use open contests that allow the free exchange of ideas with the goal of improving the ideation process. In open contests, participants ("solvers") observe the ideas of others as well as the feedback received from the contest sponsor ("seeker"). The open nature of such contests generate incentives for imitating successful early designs by future solvers at the cost of the original solvers. As such, this creates the possibility of the platform unraveling when original solvers strategically withdraw from the platform, expecting their ideas will be copied without recompense. To investigate agent behavior in such a setting, we analyze publicly accessible micro-data on more than 6,000 design contests, submissions and participants from crowdsourced open ideation platforms and augment this analysis with field and online experiments. These data include the original image files submitted to the contests, which enable us to compare how similar one image is to another using a customized ensemble image comparison algorithm. We find that better rated designs are likely to be imitated by later entering solvers, thereby generating significant risk to early entrants that their ideas will be appropriated by later entrants without recompense. As a countervailing force, we document that seekers tend to reward original designs, and avoid picking as winners those that seem to be imitating and free-riding. Seekers perceive original designers as more competent, informing their design choice. These patterns suggest that market behavior on such platforms may have a self-policing component that disincentivizes excessive imitation, rewards originality and prevents unraveling.

Presentation 2 **Status for Sale: Premium Memberships in Career Social Networks**
Simon Stolz[1], Christian Schlereth[1], Andreas Lanz[2], [1]WHU - Otto Beisheim School of Management, Vallendar, Germany; [2]HEC, Paris, France.
Abstract: Career social networks (e.g., LinkedIn) allow their users to present themselves and build connections, which eventually helps them to seize job opportunities. Consider the example of a recent graduate who is not well connected yet and, at the same time, faces the competition of other graduates. How can s/he stand out of the crowd? Since such career social networks usually offer paid premium memberships, users can upgrade their profiles to benefit from enhanced reach and visibility. More precisely, the paid premium memberships help users to build and capitalize on their increasing status, i.e., their connectedness on the platform. In this setting, (1) do low-status users consider premium membership a means for building status and (2) does it really pay off? Building on social identity theory, we expect that especially low-status users are interested in disconnecting from their low-status peers. To investigate, we analyze data from a major career social network in Europe and utilize the exogenous variation introduced by randomized marketing campaigns as an instrumental variable to identify the causal effect of a conversion on status growth. In line with social identity theory, our preliminary results suggest that there is a weak but notable negative effect of status on the decision to convert in such a setting. Moreover, we find that premium memberships pay off: Premium users have more profile visitors, messages received, and contact growth during their premium membership. However, controlling for outgoing activity, we observe that a major share of this increase is self-made - in particular regarding contact growth. Hence, while the various features of the premium version enhance attention, the users' own actions remain the main driver of their networking success.

Presentation 3 **The wisdom of the few: Predicting success by tracking key individuals**
Manuel Sebastian Mariani[1], Yanina Gimenez[2], Jorge Brea[2], Martin Minnoni[2], Rene Algesheimer[1], Claudio Juan Tessone[1], [1]University of Zurich, Zurich, Switzerland; [2]Grandata, San Francisco, CA
Abstract: Can we predict the future success of a product, service or business by monitoring the behavior of a small set of individuals? While long-standing theories in social sciences and innovation diffusion have suggested that there exists a minority of individuals who can accelerate the diffusion of innovations, the answer to this question remains debated. If these individuals are found and their purchases are persistently predictive of success, companies and organizations might track them to make reliable success predictions, and potentially target them. Motivated by this question, we analyze a massive anonymized dataset that includes credit-card transactions in brick-and-mortar stores across an entire nation, and a call-data record from the same nation. Surprisingly, we find that the purchasing history alone enables the detection of small sets of individuals - called discoverers - whose early purchases are consistently predictive of success for the visited store. In contrast with the assumptions by most existing studies on word-of-mouth processes, social hubs selected by network centrality (detected from the call-data record) are not consistently predictive of success.
Our results indicate that if the goal of an organization is to predict the future success of a product or business, the discoverers offer more reliable predictions than the social hubs and other sets of individuals. The detectability of discoverers is confirmed in data from online systems, including e-commerce websites and online communities: Companies and organizations can detect the discoverers directly from the history of purchases or information sharing activity, without the need for social network data.

Presentation 4 **Influencer Marketing Effectiveness**
Jing Niu[1], Andreas Lanz[2], Kristine De Valck[1], Peter Ebbes[3], [1]HEC Paris, Jouy en Josas, France; [2]HEC, Paris, France; [3]HEC Paris, Jouy-en-Josas Cedex, France.
Abstract: Social media have enabled the rising power of online influencers in the marketplace. The influencers' consuming preference has a significant impact on followers' purchase decisions. As indicated by a recent Harvard Business Review article, in 2018, 19% of all U.S. consumers purchased a product or service because an influencer recommended it. Unsurprisingly, firms have taken note and are now heavily capitalizing on influencers. Among all the platforms facilitating influencer marketing, Instagram is no doubt the most impactful. Brands rely on influencer marketing to connect with their customers by inserting themselves into influencers' dialogues with followers. Therefore, choosing the right influencer to partner with is an important strategic decision. Previous literature suggests that seeding the most connected individuals, usually referred to as macro-influencers (i.e., influencers with more than 100,000 followers), results in high message diffusion.

Compared to micro-influencers (i.e., individuals with significantly lower follower base), macro-influencers can influence a large audience due to their high network in-degree connectivity. In practice, however, an increasing number of marketers are opting to engage micro-influencers. This development could be explained by the increasing costs of working with macro-influencers. In this study, we compare the ROI of micro-influencer and macro-influencers across a large sample of Instagram campaigns. We propose to measure ROI by taking into account both the audience engagement for the sponsored post(s) and the compensation which the influencer received. Our findings indicate that engaging micro-influencers is more effective compared to engaging macro-influencers. Noticeably, previous research on unpaid endorsing has provided similar arguments as ours.

Presentation **Session Chair**
Jing Niu, HEC Paris, Jouy en Josas, France.

Session FA07 **Sustainability and CSR**
07
9:00 AM - 10:00 AM

Presentation 1 **Corporate Social Responsibility Practices And Its Impact On Consumer's Perceptions And Attitudes Towards Retailers.**
Rita Coelho do Vale[1], Pedro Verga Matos[2], Vera Heredia-Colaço[1], [1]Universidade Católica Portuguesa, Católica Lisbon School of Business and Economics, Lisboa, Portugal; [2]ISEG- Lisbon School of Economics and Management, Universidade de Lisboa, Lisboa, Portugal. Contact: ritavale@ucp.pt
Abstract: This research analyzes how retailers' endorsement of socially responsible practices impact consumers' attitudes and perceptions towards its products (private labels). Along with the increasing introduction of private-label products (Steenkamp, Heerde, & Geyskens 2010), retailers also started to adopt sustainable practices as a way of differentiating themselves from other players in the market. While prior research suggests that, the inclusion of sustainability characteristics will positively influence product evaluation and therefore enhance the likelihood of choice (Hainmuller, Hiscox, & Sequeira 2015), other studies suggest that product ethicality does not always drive positive product evaluations (White, McDonnell, & Ellard 2012). One market study, in which a detailed market analysis is done on the top 50 retailers worldwide, identified three main types of CSR initiatives embraced by retailers: social & community involvement, environmental & sustainable, and philanthropic & ethical. Three additional laboratory experiments, in which CSR practices were manipulated, revealed that in general, CSR practices have a positive impact on consumers' perceptions towards retailers adopting these initiatives. However, results also suggest different levels of impact on consumers' purchase intention and willingness to pay extra for retailer's product, depending on the type of CSR initiatives. Further analysis, considering consumers' green values (Haws, Winterich & Naylor, 2014), indicate that high green consumers seem to infer higher product quality when retailers engage in environmental initiatives, while low green consumers seem to prefer products when confronted with other initiatives. Overall, findings reveal interesting insights, highlighting how different CSR initiatives may have different impact in terms of product quality, willingness to pay, purchase intentions and shopping experience perceptions. Results also highlight a number of different psychological mechanisms that emerge when consumers hold distinct green consumption values.

Presentation 2 **Sustainable Product Consumption: Evidence From The Consumer Packaged Goods (CPG) Market**
Youngtak M. Kim, Sundar G. Bharadwaj, University of Georgia, Athens, GA, Contact: youngtak.kim@uga.edu
Abstract: 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 innovations that serve the needs of consumers and societal (i.e. both environmental and social) good to increase firm value. However, corporate sustainability (CS) literature is limited to studies that observe firm-level CS with fewer implications at the product level. Therefore, this study seeks to understand how sustainable innovations - product modifications or new to market introductions that provide societal benefits affect firm performance. Using consumer panel and retail data, we investigate the dynamics of product level strategies on consumer demand (i.e. sales growth) by examining the entire marketing mix of sustainable innovations. We also observe consumer characteristics (e.g. demographics, psychographics, and purchase behaviors) that further influence consumer demand. Furthermore, we construct a moderator - perceived level of firm sustainability - using machine learning techniques that reflect the views of various stakeholders who are associated with the firm and its sustainable innovations.

Presentation 3 **LOHAS (Lifestyle of Health and Sustainability) Scale Development and Validation**
SooYeon Choi, Richard Feinberg, Purdue Universiy, West lafayette, IN
Abstract: The Natural Marketing Institute (NMI) proposed that there is an identifiable group of consumers who have a style of life characterized by health and sustainability (LOHAS). The NMI defined LOHAS as an international cultural shift in lifestyle and behavior. It is claimed that LOHAS consumers pursue personal health and well-being and they are environmentally concerned. The NMI has conducted their own research and proclaim LOHAS consumer's needs, attitudes and lifestyles and believe these lead to behavior such as purchase driver of E-friendly products and the usage pattern related to sustainability and social responsibility. However, the problem with this work is that the measurement tool that they used for LOHAS research has not been empirically validated. There is some research on LOHAS. In particular, researchers in South Korea have described consumption behavior associated with LOHAS lifestyle, identified antecedents that affect the LOHAS conscious level, and studied a strategic application of LOHAS. In these studies, however, researchers used different LOHAS measuring tools. Some used the NMI-published questions but others developed their measures. Neither the NMI nor the idiosyncratic researcher scales have undergone rigorous scale development. This has led to inconsistent research findings on LOHAS. To prove the existence of the LOHAS segment and delineate their attributes and behavior accurately, a reliable and valid scale that measures LOHAS is necessary. The proposed study is designed to develop a global LOHAS scale. It followed the generally accepted scale development procedure by Churchill (1979); LOHAS domain specification, item generation, measurement purification, reliability and validity assessment. After developing a psychometrically reliable and valid scale, we tested if the scale could predict consumption behavior The result showed that the LOHAS scale is comprised of eight sub-dimensions with thirty-one items. It possesses the reliability and convergent and discriminant validity, and scale predictive validity. Nomological validity was found to be indecisive. For behavioral predictive validity, LOHAS consumers showed a high level of interest in buying eco-friendly versions across the food categories instead of other product categories including house appliances and cleaning products. First, the scale developed in this research offers a standard scale for LOHAS. This scale has psychometric qualities and offers a multifaced assessment of LOHAS that is theoretically grounded. Having a reliable and valid scale does not mean that it has validity for predicting consumer behavior. To that end this research was inconsistent in using the scale as a predictive tool. Consumers may engage in LOHAS like consumption behaviors but not related to some generalized style of living as envisioned under the NMI LOHAS concept.

Presentation 4 **The Green Gap: Why We Would Like To, But We Do Not Behave Sustainable**
Debora Costa, Radu Tanase, Rene Algesheimer, University of Zurich, Zurich, Switzerland.
Abstract: The so-called intention-behavior gap is a main discussed obstacle for the shift towards a consumer's sustainable consumption model. A considerable amount of past studies have widely used the Theory of Planned Behavior, (TPB, Ajzen, 1991) for finding new causal constructs of behavioral intention, but not many of them are known regarding actual behavior and what constructs can fill the intention-

behavior gap. To fill this gap in this research we build on the TPB for analyzing behavioral drivers in one-off behavior (single-act criterion) and shifting routine behavior (repeated-observation criterion) in sustainable food consumption (meat reduction and free meat choice), using an observational longitudinal study. We use a Latent Markov Model with Covariates to study the unobserved heterogeneity of actual consumption in an online recipe community and we show that when habit is strong, the intention-behaviour relation becomes weak.To overcome this lock-in process we propose the "Environmental Awareness of our Own Impact" (E.A.O.I.) as positive informational influence on the behavioral change. We test an intervention on customer groups (defined based on combined level of intention, behaviour and habit strength) and we show that the E.A.O.I. is effective on behavioral change, while the general environmental awareness impacts only consumer's intention. Subsequently, we test different constructs of E.A.O.I. to select the more impactful solution. These findings provide new evidence for nudging sustainable behavior and reconciling contradictory past findings while contributing to the debate regarding the necessary behavioral change tool to be used for facilitating the spread of a sustainable food consumption.

Presentation **Session Chair**
Debora Costa, UZH Universitÿt Zÿrich, Zÿrich, Switzerland.

Session FA08 **Platforms - Field Experiments**
08
9:00 AM - 10:00 AM

Presentation 1 **Promotion Effects On Non-redeemers On A Digital Platform**
Lin Boldt[1], Xueming Luo[2], Qing Liu[3], [1]University of Central Florida, Orlando, FL, [2]Temple University, Philadelphia, PA, [3]University of Wisconsin-Madison, Madison, WI, Contact: lin.boldt@ucf.edu
Abstract: While promotions evidently affect redeemers, their "advertising" effect on the vast majority of non-redeemers who do not take up the coupon remains poorly understood. It is challenging to estimate the promotion effects on non-redeemers and uncover the mechanisms related. To avoid potential estimation biases due to targeted promotions, we conduct a large-scale randomized field experiment on 22,418 users on a book-reading platform. Even with the randomization of coupon offering, the one-sided takeup compliance/noncompliance problem still exists because of customer self-selected decisions to redeem the coupon or not. We develop a Bayesian model that exploits the randomization of the treatment assignment (i.e., coupon offering) and imputes the pseudo latent redeemers and non-redeemers in the control group, after accounting for the possibility that the coupon redemption behavior and the error term of the outcome variable are correlated. We apply the model to the unrestricted free promotions, in which the digital retail platform offers free credits that can be used on a variety of the products on the platform. Our model reveals that promotions can significantly increases non-redeemers' overall spending on the platform, while alternative methods underestimate such an effect. Explorations of the mechanism suggest that promotions broaden non-redeemers' purchases by encouraging them to search for new products, but deepen redeemers' purchases by increasing their spending on current products. These findings offer useful guidance for promotion evaluation and customer targeting on digital platforms.

Presentation 2 **An Experimental Investigation Of Tipping Behavior On Digital Platforms**
Seung Hyun Kim[1], On Amir[2], Kenneth Wilbur[3], [1]University of California, San Diego, La Jolla, CA, [2]University of California-San Diego, La Jolla, CA, [3]University of California, San Diego, San Diego, CA, Contact: Seung.Kim@rady.ucsd.edu
Abstract: In the gig economy where transactions are predominantly conducted on digital platforms, customers tip in private; tipping norms are unobserved and yet established. The current paper uses data from field experiments in a global marketplace for digital services to shed light on why people leave tips in this setting. We test the role of different theoretical drivers for tipping behavior in this context. We find that providing norm-related messages is the most effective way to increase tipping behavior. These results demonstrate the central role of market norms as a critical motivator for the presence and magnitude of tipping.

Presentation 3 **Information Frictions, Sorting And Matching In Two-sided Markets**
Hyesung Yoo[1], **Song Yao**[1], Ravi Bapna[2], Jui Ramaprasad[3], [1]Washington University in St. Louis, St. Louis, MO, [2]University of Minnesota, Minneapolis, MN, [3]McGill University, Montreal, QC, Canada. Contact: songyao@wustl.edu
Abstract: The question of who matches with whom has been a central question in the matching literature. In the presence of market frictions, both heterogeneous preferences and search frictions shape the formation of a match. To better understand the relative impact of these two forces on the observed match outcomes, we use a dataset from a field experiment in an online dating platform. We find evidence suggesting that reducing information friction may lead to less sorting among matched couples across various dimensions. We estimate a model of partner choice and disentangle the impact of heterogeneous preference and information frictions on matching.

Presentation 4 **Vertical Product Differentiation In Two-sided Markets: An Empirical Analysis Of Mobile Hailing Platforms**
Yanwen Wang, Chunhua Wu, **Fan Yang**, University of British Columbia, Vancouver, BC, Canada. Contact: fan.yang@sauder.ubc.ca
Abstract: Offering vertically differentiated products is a common practice that maximizes firms' profits in markets with heterogeneous consumers. Two-sided mobile hailing platforms such as Uber provide vertically price differentiated services, for example, Uber Black along with Uber Deal, in a market which was dominated by homogeneous taxi services. However, offering vertically differentiated products in a two-sided market could be less optimal than offer a homogeneous product if the further segmented demand and supply limit the positive network effect in the two-sided market. It also poses a challenge for the platform to design price incentives to the segmented markets on both demand and supply side. In this paper, we take leverage of a unique data set with detailed information on drivers' offer taking behaviors, as well as riders' service requests, in NYC. We develop empirical demand and supply models to accommodate both the rider and driver decisions. Our results have implications on the price incentive design in a two-sided market.

Presentation **Session Chair**
Fan Yang**, University of British Columbia, Vancouver, BC, Canada.**

Session FA09 **Strengthening Academia-Industry Collaborations: Ongoing research using data from Wharton Customer Analytics 09**
9:00 AM - 10:00 AM

Presentation **Session Chair**
Raghuram Iyengar, University of Pennsylvania, Philadelphia, PA

Presentation 1 **Moderator**
Raghuram Iyengar, University of Pennsylvania, Philadelphia, PA

Presentation 2 **Overcoming the Cold Start Problem of CRM using a Probabilistic Machine Learning Approach**
Eva Ascarza, Harvard Business School, Boston, MA

Presentation 3 **Direct Mail to Prospects and Email to Current Customers? Managing Multichannel Marketing for L'Occitane**
Shuba Srinivasan, Boston University, Boston, MA

Presentation 4 **Value Of Consumer Purchase Histories For Predicting Credit Defaults**
Jung Youn Lee, Northwestern University, Evanston, IL, Contact: jungyoun.lee@kellogg.northwestern.edu

Presentation 5 **Panelist**
Guillaume Thfoin, Majid Al Futtaim, Dubai, United Arab Emirates.

Presentation 6 **Panelist**
Julien Boucher, L'Occitane, Rhone-Alpes, France.

Presentation 7 **Panelist**
Elea McDonnell Feit, Drexel University, Philadelphia, PA

Session FA10 **Spatial and Distance Applications**
10
9:00 AM - 10:00 AM

Presentation 1 **Evomap: Mapping Competitive Trajectories In Evolving Market Structures**
Maximilian Matthe[1], Daniel M. Ringel[2], Bernd Skiera[1], [1]Goethe University Frankfurt, Frankfurt am Main, Germany; [2]Kenan-Flagler Business School UNC Chapel Hill, Chapel Hill, NC, Contact: matthe@wiwi.uni-frankfurt.de
Abstract: Competitive market structure maps provide managers with static snapshots of their markets. Yet, given today's dynamic competitive environments, markets tend to be in flux. As consumer needs change, firms adjust their positionings and new submarkets emerge while others disappear. Under such conditions, a mere snapshot of firms' competitive positions provides insufficient insight. Decisive are firms' *competitive trajectories*, that is, the evolution of their competitive positions over time. While converging trajectories indicate competitive threats, diverging trajectories point to an increase in differentiation. Herein, we propose *EvoMap*, a novel dynamic spatial visualization method that reveals firms' competitive trajectories under changing market conditions. *EvoMap* allows managers to determine (i) whether they are "on the right track" (i.e., trajectory) relative to their strategic objectives, (ii) who their most relevant competitors are (with converging trajectories), and (iii) the extend and speed of which new entrants evolve into competitive threats to them. We validate *EvoMap* in an extensive simulation study and show that extant mapping approaches insufficiently capture the dynamics of evolving markets. Using *EvoMap,* we study the rapidly evolving Smart Home market, and identify emerging competitors much earlier than previously possible.

Presentation 2 **Marketing Mapping Evaluation with QVisVis**
Stephen France[1], Ukas Akkucuk[2], [1]Mississippi State University, Mississippi State, MS, [2]Bogazici University, Istanbul, Turkey.
Abstract: The use of mapping techniques has a long history in marketing. Mapping methods have been developed to display the relative positioning of consumers, brands, or other marketing entities, using behavioral or perceptual data. Such methods usually take source data and then embed these data in 2 or 3 dimensional solutions in a process that is usually referred to as dimensionality reduction or embedding. However, due to a loss of degrees of freedom, such embeddings are rarely perfect. Faulty conclusions can be made from marketing maps. For example, a marketing manager may conclude that brand B is closer to brand A than brand C when in fact the converse may be true. It is thus useful to be able to evaluate the quality of marketing mappings with respect to solution quality.
This presentation describes a visualization framework called QVisVis (France & Akkucuk, 2020), which uses the concept of rank order neighborhood recovery to evaluate the quality of dimensionality reduction solutions. The framework is implemented in an associated R software toolkit, which contains code for calculating dimensionality reduction solution quality, along with an array of visualization tools. The presentation includes a range of marketing mapping examples.
ReferenceFrance, S. L., & Akkucuk, U. (2020). A review, framework, and R toolkit for exploring, evaluating, and comparing visualization methods. The Visual Computer, In Press.

Presentation 3 **Optimal Attitude Change In A Revised Hotelling Framework: An Economic Voting Model**
Aharon Hibshoosh, San Jose State University and Lincoln University, Oakland, CA, Contact: rhibshoosh@gmail.com
Abstract: We extend Hibshoosh (1987) optimal attitude distribution change for a voting model, merging it with a substantively revised Hoteling (1929) Framework. In an election with two candidates, a marketer with a stream of fixed budgets, and acting myopically, is attempting to increase the probability of winning an election by changing the mean and standard deviation of the distribution of undecided voters' attitude toward voting for a particular candidate. We allow: a) non-deterministic individual voter choice, b) both positive and negative stochastic appeals, c) nonlinear unique proximity metrics between voters' ideal and candidate position, d) nonlinearly combined weighted distances of voter's ideal from competitors, as the voter's utility argument, e) non uniform distribution of voters' ideals represented by societal conception of product use, based on the consumer degree of preference for convexity, and mixture. This required flexibility, makes versions of the Beta distributions play an important role in our analytical inquiry. For example, we establish that the normalized gap in candidate appeals (Hotelling Prices) corresponds to a ratio estimate of the attraction parameters in the Beta distribution. We show that the ability to independently change the mean and the standard deviation, critical for optimal economic control, may apply in the case of the beta distribution and its generalizations, and deal with identification and estimation problems of the parameters. We generate a variety of generalizations of common reference results.

Presentation **Session Chair**
Aharon Hibshoosh, San Jose State University and Lincoln University, Berkeley, CA

Session FA11 **Technological Advances in Education**
11
9:00 AM - 10:00 AM

Presentation 1 **Assisting Teachers with Artificial Intelligence: Investigating the Role of Teachers Using a Randomized**
Minki Kim[1], Jun Hyung Kim[2], Do Won Kwak[3], Sol Lee[4], [1]KAIST, Seoul, Korea, Republic of; [2]Jinan University, Guangzhou, China; [3]Korea University, Seoul, Korea, Republic of; [4]KAIST Business School, Seoul, Korea, Republic of.
Abstract: This study investigates whether artificial intelligence (AI) can transform the teacher's role by delivering personalized learning to each individual student. Conducting a randomized controlled trial in collaboration with an education company, we evaluate how providing teachers with AI assistance impacts students' academic outcomes. We find that providing AI-generated reports to teachers significantly improves students' study effort and performance, although those effects vary by teacher and class characteristics. Consistent with the organizational literature on technology and worker productivity, our findings indicate that *technology overload* could undermine teachers' effective use of AI coaching despite its highly accurate diagnostic ability and ready availability. Although some teachers did not utilize the AI coaching program, we found positive effects among the students of both compliers and non-compliers. We therefore decompose our results to identify direct and spillover effects on students' academic performance and show that failing to account for spillover effects across teachers (externality among peers) and within teachers (learning-by-doing across students) may understate the effects of AI coaching. Finally, we provide practical guidelines for implementing technology in educational settings.

Presentation 2 **Testing Theories of Goal Progress in Online Learning**
Joy Lu[1], Eric Bradlow[2], J. Wesley Hutchinson[2], [1]Carnegie Mellon University, Philadelphia, PA, [2]University of Pennsylvania, Philadelphia, PA
Abstract: Online educational platforms allow learners to progress at their own pace with opt-in and on-demand structures. Thus, it is important to understand how learners consume course content within these environments. Using clickstream data from Coursera, we build a mathematical choice model that captures individual decisions about watching lectures and taking quizzes. The key feature of our model is that learners may be heterogeneously motivated to progress towards the goal of completing the course by consuming content, with individual preferences for completing lectures (i.e., progressing towards a pure learning goal) or completing quizzes (i.e., progressing towards a goal to pass the course). This feature allows us to empirically test theories of goal progress within an educational setting. We apply our model to four different courses, and use samples of both learners who took the courses for free and learners who paid for the courses for the option to earn a course certificate. We find similar goal progress patterns across the courses, and significant differences in behavior between "free" and "paid" learners.

Presentation 3 **Effect of Payment on User Engagement in MOOCs**
S. Sriram[1], Srinivasaraghavan Chintagunta[2], Ali Goli[1], [1]University of Michigan, Ann Arbor, MI, [2]University of Chicago, Chicago, IL
Abstract: MOOCs have the potential to democratize access to education by improving access. Although retention and completion rates for free users have not been promising, these statistics are much brighter for paid users who receive a certificate upon completing the course. We investigate whether paying for the certificate option can increase engagement with course content. In particular, we consider two such effects: (a) certificate effect, which is the boost in motivation to stay engaged in order to receive the certificate and (b) sunk cost effect, which arises solely because the user paid for the course. We use data from over 70 courses offered on the Coursera platform and study the engagement of individual participants at different milestones during the course. The panel nature of the data enables us to include strong controls for intrinsic differences between free and paid users in terms of their desire to stay engaged. We find evidence that the certificate and sunk cost effects increase user engagement by approximately 10-12% each. However, while the sunk cost effect is transient and lasts only for a few weeks after payment, the certificate effect lasts until the participant reaches the grade required to be eligible to receive the certificate. We discuss the implications of our findings for how platforms and content creators may want to design course milestones and schedule the payment of course fees.

Presentation **Session Chair**
S. Sriram, University of Michigan, Ann Arbor, MI

Friday, June 12, 2020
Session "FB"
10:15 AM - 11:15 AM

FB01. Machine Learning, Artificial Intelligence, and Causal Inference in Marketing VI

FB02. Text and Sentiment Analysis

FB03. Game Theory: Retailing

FB04. Omni-Channel Retailing: Insights, Implications, and New Directions

FB05. Targeting Communications and Personalized Promotional Offers

FB06. Insight into Online Communities and Social Influence

FB07. COVID

FB08. Platforms I

FB09. Gary Lilien ISMS-EMAC-MSI 2020 Practice Prize Finalists

FB10. ESTIMATING CAUSAL EFFECTS OF MARKETING ACTIONS

FB11. ISMS Doctoral Prize winners

Session FB01 **Machine Learning, Artificial Intelligence, and Causal Inference in Marketing VI**
01
10:15 AM - 11:15 AM

Presentation 1 **Mobile App Ranking and Fake Reviews**
Xian Gu, Jingcun Cao, Indiana University, Bloomington, IN
Abstract: With the rapid development of online markets and distribution platforms, countless number of products and services are available online. To facilitate consumers in their shopping decisions, one common practice of those online markets and distribution platforms is to provide a ranking of their top products based on factors such as product popularity, sales, and customer ratings. For example, Amazon shows its rankings of best sellers in different product categories. The mobile app stores also provide rankings of their most popular applications. Given the huge number of available alternatives, it is in general impossible for consumers to go through every single product. Instead, consumers often rely on the product rankings to make their product choices. As a result, it is essential for sellers to make sure that their products rank high on the charts. However, the importance of the product ranking also gives sellers the incentives to create fake reviews for themselves and for their competitors, which can drive the ranking of a product on the charts. Our research aims to investigate how the fake reviews affect product ranking. We acquire a rich and unique dataset of Apple's App Store which records the daily app rankings, app reviews (including reviews that are identified as fake and filtered by App Store), and other app information over a one-year period from 2018 to 2019. In this research, we investigate the direct effect of fakes reviews on the corresponding app as well as the spill-over effect on the app's competitors. Moreover, we compare the impact of fake reviews to other marketing strategies (i.e., promotion and keyword selection) in the app marketing. Our findings will not only shed lights on the impact of fake reviews on products ranking to researchers, but also provide crucial managerial implications to practitioners and policy makers.

Presentation 2 **Understanding Risky Response and Information Disclosure Using Mobile Metadata and Machine Leaning**
Jayson S. Jia[1], Jianmin Jia[2], [1]University of Hong Kong, Hong Kong, Hong Kong; [2]CUHK Business School, Hong Kong, Hong Kong.
Abstract: Risks define the digital environment as much as the physical world; behind every digital interaction, whether responding to a commercial solicitation or a friend request on Facebook, lurks a plethora of potential downstream risks ranging from identity theft to fraud to viruses. We investigate what drives and facilitates two basic forms of risky interactions; 1) responding to unverified strangers, and 2) revealing sensitive personal information to unverified strangers. In order to explore these issues in a real setting, we run field experiments on a mobile telecommunications network, as well as access to subjects' individual-level mobile metadata, e.g., call and SMS records, usage, phone model, customer records, etc. (N=20,000 individuals in experiments who are connected to a further ~400,000 individuals in the network). Across 5 field studies, we explore the relationship between individuals' behavioral and social network characteristics (derived from their mobile metadata) to predict and understand what drives their actual response behavior by machine learning methods.

Presentation 3 **Designing Email Content to Increase Customer Engagement**
Prasad Vana, Pradeep Pachigolla, Scott Neslin, Dartmouth College, Hanover, NH
Abstract: Email remains one of the key digital channels through which marketers can reach and engage with customers. The extant research in marketing has focused on such questions as how email promotions, the subject line of the email, or the number of times an email was sent to a customer affect customer behavior. In this research we focus on how the content within the body of the email affects customer engagement. In particular, we investigate how the text content in the body of the email as well as the images in the email affect customers' likelihood to open an email as well as click on links present in its body. We use data from a large food company that routinely sends emails to its subscribers. To represent content, we use the natural language processing technique of word embeddings and cluster the words in the body of 28 emails into 12 topics. We capture the image information present in the email through metrics related to color, including brightness, hue, and saturation. We estimate Tobit models to model several outcomes including the daily email opens, clicks, page views, time spent on the page as well as social shares as a function of the text and image variables. Based on our results, we generate several suggestions for text and images to be used in the body of the email that would increase customer engagement.
10:15 AM - 12:30 PM

Presentation **Session Chair**
Prasad Vana, Dartmouth College, Hanover, NH

Session FB02 **Text and Sentiment Analysis**
02
10:15 AM - 11:15 AM

Presentation 1 **More Than A Feeling: The Relevance And Versatility Of Emotions On Social Media**
Christian Hotz-Behofsits, Nils Wloemert, Nadia Abou Nabout, Vienna University of Economics and Business, Vienna, Austria.
Abstract: Human emotions such as anger, sadness or joy have been extensively researched in psychology for centuries. With advances in natural language processing techniques, this topic has also received increasing attention in the field of marketing in recent years. However, although sentiment analysis is widely applied to extract emotions from text, analyses are typically confined to a bi-polar classification (i.e., positive or negative), while research from psychology suggests that it is beneficial to distinguish between a broader set of emotions. There are two main reasons for this shortcoming: 1) the difficulty in measuring a broader set of emotions and 2) the assumption that already a small number of emotions is sufficient to explain most effects. To address the first issue, we present a deep neural network based approach that allows researchers to efficiently extract emotions from text. This proposed method can be applied to short texts and texts of poor language quality (e.g., online comments or reviews). In addition, we use a so-called attention-mechanism to enable a better interpretability of the results. In this way, we can assess, which parts of the input are decisive for the inferred emotion. To this end, we exploit emojis as noisy labels for emotions and use more than 4 billion generic tweets for training. To address the second issue, we show the added value of considering a variety of emotions using an empirical application. Specifically, we use a prediction task (i.e., predicting the number of views a video receives on a streaming platform from the comments) to demonstrate the superior performance of using a richer set of emotions. The performance gain is due to the inability of simpler methods to discriminate between emotional content. For example, anger and sadness are both frequently attributed as negative emotions using a bi-polar classification. However, these emotions may lead to utterly different consumer decisions.

Presentation 2 **Clickbait Impedes Sharing**
Prithwiraj Mukherjee[1], Souvik Dutta[2], Dalhia Mani[1], [1]Indian Institute of Management Bangalore, Bangalore, India; [2]Indraprastha Institute of Information Technology Delhi, Bangalore, India. Contact: pmukherjee@iimb.ernet.in
Abstract: Clickbait is a method of framing articles' titles to induce readers to click on them, and is a common feature of online media today. We use a publicly available data set consisting of articles from 25 media organizations, each of which is rated as clickbait or not by human respondents, and augment it with Twitter retweet count, sentiment analysis and topic modeling. We demonstrate that human interest articles are positively associated with clickbait. We also show that the fraction of people with journalistic backgrounds in an organization's top management team is positively related to its clickbait usage. Finally we show that clickbait is rebroadcast less than non-clickbait on social media. Our results serve as a cautionary message to media organizations and digital marketers, who may be inadvertently harming the reach of their content by using clickbait.

Presentation 3 **A RECIPE FOR CREATIVE RECIPES: AN INGREDIENT EMBEDDING APPROACH**
Sibel Sozuer, Oded Netzer, Columbia Business School, New York, NY, Contact: sibel.sozuer@columbia.edu
Abstract: An idea can be described as a collection of existing concepts or words. What makes an idea original or ordinary is how these concepts or words are combined together in the context in which they appear. In a similar manner, food recipes may be perceived as novel or conventional based on the combination of ingredients in the recipe. In this study, we build on research in word embeddings to investigate how novelty and conventionality of the recipes affect people's attitudes towards these recipes and propose a model to generate more creative and more favorably evaluated recipes by suggesting alternative combination of ingredients. Embeddings allows us to model the complex interactions between the ingredients that appear in the same recipe and build measures that capture its novelty compared to all the other recipes. The differential impact of novelty on popularity and preference is not well understood. We investigate what is the effect of the novelty of the recipe ingredients on how popular the recipe is (how many people tried it) and how favorably people who tried the recipe evaluate it (as measured by star ratings). We use these findings to develop a generative recipe tool that improves recipes through elaboration, simplification or replacement of ingredients.

Presentation 4 **Mining Customers' Experiences: A CX Index From UGC**
Oliver Borchers[1], **Daniel M. Ringel**[2], Sabine Kuester[1], [1]University of Mannheim, Mannheim, Germany; [2]Universitiy of North Carolina at Chapel Hill, Chapel Hill, NC, Contact: dmr@unc.edu
Abstract: The extent to which customers financially reward positive experiences and punish negative ones, is fundamental to how markets function. The authors mine customers' experiences from social media to inform both marketing mix and investment decisions. In contrast to constructs such as customer sentiment, customer experience (CX) comprises multiple, overlapping dimensions (i.e., cognitive, emotional, social, behavioral and sensory). It's multifaceted and pervasive nature makes CX challenging and costly to study, but promises deeper insights. We propose a novel, automated approach for capturing, quantifying and decomposing CX based on the content that consumers post on Twitter. Therein, we combine recent breakthroughs in natural language processing with supervised and unsupervised learning models to construct a customer experience index from social media (CXS). Our index captures the extent to which customers' experiences with firms are positive. We test our new approach in an empirical study of 50 firms from over one dozen industries using 400 million tweets of the past 10 years. We find that CXS significantly relates to firm value (i.e., market value of equity). We also find that CXS relates to firm value more strongly than alternative metrics such as sentiment indices and the American Customer Satisfaction Index (ACSI). We demonstrate along several examples how firms can use our new approach to identify topics that drive their CXS (e.g., gender discrimination at Home Depot), and how investors can improve their returns by using CXS to rebalance their portfolios. Finally, we show that while CXS conceptually overlaps with sentiment and satisfaction, it captures additional facets that previous indices do not.

Presentation **Session Chair**
Daniel M. Ringel, Kenan-Flagler Business School UNC Chapel Hill, Chapel Hill, NC

Session FB03 **Game Theory: Retailing**
03
10:15 AM - 11:15 AM

Presentation 1 **Ripple Effects: The Impact Of Shipping And Return Policies Of Omnichannel Retailers On Supply Chain Performance And Relationships**
Abhishek Roy[1], Zhuping Liu[2], Subodha Kumar[3], [1]Temple University, Fox School of Business, Philadelphia, PA, [2]Baruch College, City University of New York, New York, NY, [3]Fox School of Business, Temple University, Philadelphia, PA, Contact: abhishek.roy@temple.edu
Abstract: The rapidly evolving landscape of retailing, in particular for omnichannel retailers, has created a new set of challenges for managers. By the virtue of its operations, an omnichannel retailer can select from a wider set of shipping and return options. These shipping and returns policies impact consumer behavior, and therefore the supply chain decisions, these policies consequently affect the retailer's overall financial performance, as well as its relationship with its channel partners.
Overall, how these consumer-facing policies are chosen greatly impacts the overall supply chain, and these interactions are of increasing importance to academics and practitioners alike. However, to the best of our knowledge, the literature in marketing and supply chain management has not studied the joint impact of an omnichannel retailer's shipping and returns policies on its supply chain decisions (such as assortment and inventory management), as well as overall performance, and its relationship with the channel partners.
We address the following main research questions. First, how do different consumers change their purchasing behavior, based on an omnichannel retailer's shipping and returns policies? Secondly, how does an omnichannel retailer's choice of shipping and return policies affect supply chain and financial performance? Finally, how does an omnichannel retailer's choice of shipping and returns policies affect its relationships with its supply chain partners?
We develop an analytical modeling framework to study the interaction between different shipping and returns policies of the retailer with the consumers' purchasing and returns behaviors, and their implications on supply chain decisions within the retailer's firm and across the supply chain. We provide academic and managerial insights on the overall impact of an omnichannel retailer's shipping and returns policy decisions on consumer purchasing behavior, and the associated ripple effects on the retailer's supply chain and overall financial performance, as well as on its relationships with its supply chain partners.

Presentation 2 **Cooperating With Your Competitor: A Strategic Analysis Of Accepting Customer Returns**
Prasenjit Mandal[1], Abhishek Roy[2], Preetam Basu[1], [1]Indian Institute of Management Calcutta, Kolkata, India; [2]Fox School of Business, Philadelphia, PA
Abstract: Pure-play online retailers often fiercely compete with brick and mortar (BM) retailers through aggressive price discounts and flexible return policies. Against this backdrop, it is somewhat unconventional and counter-intuitive that a few BM retailers have recently started accepting product returns of their online competitors. For example, Kohl's has begun accepting and processing returned merchandise for Amazon. Therefore, this leads to an interesting business phenomenon where two retailers compete in the end-market but at the same time cooperate in terms of managing customer returns. Using a stylized game-theoretic model, we develop benchmark competition and return cooperation models where a BM retailer (she) competes with an online retailer (he) for end-consumer demand while cooperating by accepting and processing his product returns. We characterize the optimal pricing policies of both the retailers and determine market conditions under which this competition-cooperation based mechanism becomes viable. Contrary to conventional wisdom, our analysis reveals that all parties, including both the retailers as well as consumers, benefit from this competition-cooperation mechanism under specific market conditions. Our study also provides important managerial recommendations for retailers to pursue such an unconventional return policy in various retailing landscapes.

Presentation 3 **Marketing Channels With Fair-trade Product: A Theoretic Analysis**
Hui Wang, Tirtha Dhar, **Yuanfang Lin**, University of Guelph, Guelph, ON, Canada. Contact: yuanfang@uoguelph.ca
Abstract: Consumers nowadays have growing concern about factors beyond self interest in purchase decisions. Such factors include environmental sustainability, social responsibility and welfare, and fairness issues. In response firms have been striving to assure consumers that the products offered to them have been produced in an ethical and sustainable way. This paper focuses on the marketing of products with fairtrade certification, one of the most widely adopted approach aiming to offer a credible way to demonstrate socially and environmentally responsible production. However there has been growing concerns regarding the flaws, market potential and the actual benefits the fairtrade system provides. This paper uses a stylized model of marketing channel to study the competition between farmers of fairtrade and regular products selling through retailers to end consumers. Our findings suggest that a monopolist retailer would not offer both fairtrade and regular products on the shelf. Rather he enjoys higher profit by only selling fairtrade product to part of the market. The implication is that consumers are willing to pay more for the fairtrade product with the intention of helping fairtrade farmers, yet this comes with the welfare cost as part of the market will not be served. When there is retail competition, we found that the profit of a retailer offering regular product could outperform his fairtrade rival when the quality differentiation between the two types of products is relatively small. Small quality differentiation drives the fairtrade retailer to reply more on consumers' willingness to pay for social premium. The fairtrade farmer acting strategically will increase wholesale price to extract more surplus. The fairtrade retailer ends up making less profit while the benefit of fairtrade is transferred to the upper stream of the channel. Further analyses suggest that both consumer surplus and total social welfare benefit from the coexistence of regular and fairtrade products as well as the competition at various levels (farmer, retailer) of distribution channel.

Presentation 4 **Match Uncertainty In Online Channels: Dynamic Mechanism Design Of Price And Return Policies**

Amit Pazgal[1], K. Sudhir[2], **Li Yang**[3], [1]Rice University, Houston, TX, [2]Yale School of Management, New Haven, CT, [3]Rice University, Houston, TX, Contact: ly21@rice.edu

Abstract: Consumers have significant match uncertainty when buying through online retail channels, but return policies can mitigate the demand suppression effect of that uncertainty. Since consumer uncertainty over matching is resolved over time only after purchase, the retailer's price discrimination problem in offering a menu of price and refund terms to different segments is a sequential screening problem that requires a dynamic mechanism design based analysis. In this paper, we model the channel in a leader-follower framework with the manufacturer as the leader choosing wholesale price and refund terms for the retailer; and the retailer as the follower solving a sequential screening problem to discriminate among consumers based on price and refund terms. To the best of our knowledge, we are the first to introduce the sequential screening problem in a dynamic mechanism design framework into marketing. Interestingly, the retailer finds it optimal to offer a lower initial price to the customer segment with higher mean valuations and higher value uncertainty, but with smaller refunds. The chance of higher ex-post matching values among the high types makes lower prices and smaller refunds both individually rational and incentive compatible across segments. Retail price and refunds paths are not impacted by manufacturer changes in wholesale prices alone; the manufacturer's optimal strategy is to raise wholesale price and offer a partial refund to the retailer. Though the introduction of partial refunds to the retailer induces double marginalization in the form of higher retail prices (but more generous refund terms to consumers) manufacturer profits increase, while hurting retailer profits. Despite the more generous return policies, the higher retail prices due to double marginalization reduces total channel profit. in particular, we find that while the channel profits from returned goods is higher, the greater drop in profits from sold goods overwhelms the other gain.

Presentation **Session Chair**

Li Yang, Rice University, Houston, TX

Session FB04 **Omni-Channel Retailing: Insights, Implications, and New Directions**
04
10:15 AM - 11:15 AM

Presentation 1 **Cross-Channel Effects of Omnichannel Retail Marketing Strategies**
Ahmed Timoumi, Manish Gangwar, Murali Mantrala, Indian School of Business, Hyderabad, India.
Abstract: Within the last few decades, the advent of online retail websites, marketplaces, and additional digital platforms such as mobile phone shopping apps and social media, has disrupted and transformed the world of retailing by providing multiple avenues for sellers to connect with buyers. As a result, the term 'Omnichannel' has gained currency over the last few years. This trend signifies the abilities and dispositions of contemporary consumers to crisscross and avail of the multiple channels at various stages on their 'paths to purchase' for products and services. Omnichannel retailing allows consumers to explore, consider, evaluate, compare the choices available across multiple channels while buying a product. This consumer behavior compels all multichannel retailers to think about how to manage and influence interactions with consumers across various touchpoints in different channels and leverage their marketing strategies in order to win their business by increasing their sales and revenues. This article provides a comprehensive review of the extant empirical research-based knowledge of cross-channel effects in an omnichannel environment . Specifically, we provide a conceptual framework and integrative review of extant research findings regarding consumer channel choice and response across purchase journey stages (pre-purchase, purchase, post-purchase) to multichannel retailers' marketing strategies and the impact on the latter's performance. Based on this review, we derive implications for future omnichannel retailing practice and research.

Presentation 2 **Online and Offline Retailing: What We Know and Directions for Future Research**
Dinesh Gauri[1], **Brian Ratchford**[2], Gonca Soysal[1], Dinesh Gauri[3], [1]University of Arkansas, Fayetteville, AR, [2]University of Arkansas, Plano, TX, [3]University of Texas, Plano, TX
Abstract: Growth of e-commerce is rapidly changing consumers' shopping habits and shaping the future of the retail industry. Many factors are driving this growth, including the proliferation of smartphones, tablets, and other portable devices, increased consumer confidence in online shopping, and the retailers' increased investments in the online channel and digital marketing budgets. With this fast-paced growth, comes the need to re-think many elements of the firms' retail strategy. While online retailing has allowed companies to overcome geographic barriers to selling and helped them achieve operational efficiencies, offline retailers have had a hard time competing with online retailers and many retailers chose to operate both online and offline. In this paper we present a review of the literature on the interaction between e-commerce and offline retailing, highlighting empirical findings and generalizable insights, and discussing their managerial implications. We also develop recommendations for future research. We examine the previous literature under seven main headings: (1) Online and Offline Channels: Competition and Complementarity, (2) Impact of E-commerce on the Concentration of Sales, (3) Management of Product Returns across the Online and Offline Channels, (4) Impact of E-Commerce on Consumer Search Behavior and Price Dispersion, (5) Impact of Changes in the Promotional Landscape on Retailing, (6) Impact of E-commerce on Retail Markets for Information Goods, (7) Big Data and Its Impact on Retailing

Presentation 3 **The Omnichannel Continuum: How Far is Far Enough?**
Scott Andrew Neslin, Dartmouth College, Hanover, NH
Abstract: Omnichannel marketing is often described as a means to provide a "seamless" multichannel experience for consumers. However, actually there is a continuum of omnichannel strategies, ranging from customer segmentation by channel to complete integration, the quintessential omnichannel strategy. We propose a framework for defining this continuum. The framework is based on (1) three channel functions: providing customers information, a means to purchase, and aftersales support, and (2) the fundamental distinction between online and offline channels. The framework identifies four architype strategies: Segmentation, Horizontal, Vertical, and Complete. The Segmentation strategy designs online channels to cater to one group of customers for all functions, and offline channels to cater to another group. The Complete strategy eschews segmentation and designs all channels to appeal to all customers, encouraging them to traverse channels as they wish. Between these extremes lie Horizontal and Vertical strategies. The Horizontal strategy focuses on seamless integration separately for each function. For example, the customer could use online or offline seamlessly to gather information, but there would not be much integration between functions. The Vertical strategy would integrate across functions. For example, it would be easy for the customer to find information online but purchase offline. There are hybrids as well. For example, horizontal integration for purchase but segmentation for aftersales. This paper examines the pros and cons of the architype strategies, recommends future research, and provides guidance for how far retailers should place themselves along the omnichannel continuum.

Presentation **Session Chair**
Scott Andrew Neslin, Dartmouth College, Hanover, NH

Session FB05 **Targeting Communications and Personalized Promotional Offers 05**
10:15 AM - 11:15 AM

Presentation 1 **Using the Timing of Part Responses to Target in the Face of Dilution**
Spyros Zoumpoulis[1], Theodoros Evgeniou[1], Artem Timoshenko[2], [1]INSEAD, Fontainebleau Cedex, France; [2]Northwestern University, Evanston, IL
Abstract: A key challenge that managers face when making marketing decisions is to adjust for any changes in the business environment that may make past data misleading. One key but underexplored type of change is dilution of a market. Dilution occurs in contexts where customers can only respond once to marketing actions, so customers who respond in the past cannot respond again in the future. In a batch learning environment this characteristic can hinder the training of models designed to target different customers with different marketing actions. We propose the timing of past responses as a measure of dilution and show empirically, as well as with an illustrative theoretical model, that the timing of past responses can inform the relationship between past responses and future responses. Our results can accommodate changes in the firm's marketing actions, and we show that the information value of timing for predicting future responses from past responses depends upon the effectiveness of the marketing actions. We further illustrate how to incorporate the timing of past responses when training a targeting policy. Using data from two field experiments, we demonstrate that a targeting policy trained using the timing of past responses can significantly outperform a policy trained without using timing. The timing of past responses is particularly useful for targeting future actions when there is a large difference in the effectiveness of the marketing actions.

Presentation 2 **Dynamic Personalized Pricing Using Batch Deep Reinforcement Learning: An Application to LiveStream Shopping**
Xiao Liu, New York University, New York, NY
Abstract: Dynamic personalized pricing can improve market efficiency. Prior solutions to the dynamic personalized pricing problem, often in the format of discount coupon targeting strategies, either ignore long term demand implications or suffer from model bias. We propose a batch deep reinforcement learning algorithm and apply it to a novel livestream shopping context. Our batch deep reinforcement learning algorithm has four comparative advantages over existing strategies. First, it can capture consumers' intertemporal tradeoffs associated with dynamic pricing, especially the reference price effect. Second, it is not prone to model bias in dynamic structural models, because it is based on Q-learning, a model-free reinforcement learning solution. Third, it solves the curse of dimensionality by leveraging deep neural works to represent the high-dimensional state space. Fourth, it requires only historical data rather than live experimentation, as both policy learning and policy evaluation operate in the batch mode. Using both a field experiment and an off-policy evaluation method, we show that our solution can increase the livestream shopping platform's revenue by 60%, twice more than myopic targeting policies. The dynamic targeting strategy recommends providing a small discount for more attractive hosts and increasing the coupon discount level over time because of the reference price effect.

Presentation 3 **Cross-Category Product Choice: A Scalable Deep-Learning Model**
Artem Timoshenko[1], Sebastian Gabel[2], [1]Northwestern University, Evanston, IL, [2]Humboldt University Berlin, Berlin, Germany.
Abstract: Many retailers rely on coupon personalization to increase sales and profits. Coupon personalization solutions require a product choice model to predict how coupons affect customer purchasing behavior. Large retailers handle over 10,000 products across hundreds of categories, so scalability and operating without extensive category and product attribute information are important to product choice modeling. We address these practical challenges with a custom deep neural network architecture that includes convolutional filters, bottleneck layers, and weight sharing. Our model applies to loyalty card transaction data without predefined categories or product attributes, and it efficiently captures crossproduct relationships and dynamic consumption patterns, such as those due to inventory depletion. We first evaluate the model with empirically-grounded synthetic data. Our model predicts purchase decisions better than baseline machine learning methods by adjusting predicted probabilities for coupon effects and recent purchases. Using the proposed model for coupon personalization leads to substantially higher revenue lifts. We verify the prediction performance using transaction data from a large retailer with experimental variation in coupon assignments.

Presentation **Session Chair**
Artem Timoshenko, Northwestern University, Evanston, IL

Session FB06 **Insight into Online Communities and Social Influence**
06
10:15 AM - 11:15 AM

Presentation 1 **The Effects Of Brand Orientation And Digitization Of Community Experiences On Active Participation: Evidence From Meetup.com**
Martina Pocchiari[1], Jason M.T. Roos[2], [1]Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands; [2]Erasmus University, Rotterdam, Netherlands. Contact: pocchiari@rsm.nl
Abstract: Brand communities are an increasingly popular tool to connect directly with customers and achieve a variety marketing goals. However, without the active participation of their members, brand communities are bound to fail and disappear. This research assesses the effect of prominent brand orientation and of digitization of community activities on individual members' participation intentions, in the empirical context of the online platform Meetup.com. The effects are estimated across a large number of communities with varying degrees of brand- orientation and digitization, using both a structural model and causal random forests. Preliminary results show that a prominent brand orientation has a positive impact on member participation in community activities. Furthermore, organizing a community activity online does not affect participation on average, but the effect varies significantly across potential attendees. The results of this study can help marketing managers to improve brand community design and achieve higher member participation.

Presentation 2 **Is word-of-mouth always effective at driving sales?**
Yuchi Zhang, Santa Clara University, Santa Clara, CA

Presentation 3 **Effects of Attention on Engagement, Content Creation and Sharing: Experimental Evidence from an Image Sharing Social Network**
Justin Huang[1], Sridhar Narayanan[2], [1]Stephen M. Ross School of Business, University of Michigan, Ann Arbor, MI, [2]Stanford University, Stanford, CA, Contact: huangjt@umich.edu
Abstract: In this study, we examine the impact of attention received by a user's content on a social network on that user's subsequent engagement on the network, content creation and content sharing. The study of the impact of attention is typically challenging because it is not randomly assigned. Systematic differences within and across users in the degree of attention received by content shared by them makes the identification of attention effects difficult. To solve this identification problem, we implemented a field experiment in collaboration with an image-sharing social network, where we experimentally manipulated attention by selectively featuring users' content. A unique aspect of our experimental context is that we are able to observe both on-network and off-network activity of the individuals concerned. The main results of our experiment are that being featured and thereby getting attention on the network increases engagement, tie formation, posting of creative output and the usage of underlying software tools used to create content. We explore the temporal variation and heterogeneity in these effects. We also explore the social effects of attention on peers of the featured users and find that the effects of treatment on peers of the treated individuals are small.

Presentation 4 **A Meta-analysis About The Drivers And Effects Of Participation In Online Communities**
Jing Niu[1], **Kristine De Valck**[1], Caroline Wiertz[2], [1]HEC Paris, Jouy en Josas, France; [2]Cass Business School, London, United Kingdom.
Abstract: Based on 700 observations from 62 studies, this meta-analysis examines the drivers and outcomes of members' participation in online communities. We find that the emotional driver, functional driver, the linking value driver and the social norm driver affect members' online community participation, including the content producing participation and the content consuming participation. Moreover, we find that the two types of participation have outcome effects on the online community members, the communities and the firms that host the communities. Finally, the strengths of both the driving effects and the outcome effects vary across community type and ownership.

Presentation 5 **Impact Of Social Contagion On Consumption Volume Of Entertainment Goods**
Maciej Szymanowski, Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands.
Abstract: Entertainment industry is transitioning away from record sales towards a model with unlimited access to a very large library of content for a fixed, flat subscription fee. In such a context, minimizing consumer's search costs she incurs when choosing content can be an important aspect of product strategy. Entertainment companies facilitate content discovery by highlighting content they deem relevant to a given user. Prior research in the area focused on sampling probability as a behavior of interest. It has been shown that users are more likely to sample content which is popular in the general population (global social influence) and in given user's online social network (local social influence). In this paper we adopt a broader perspective, we study not only sampling probability but also consumption volume. Consumption volume is an important measure of utility in the context of zero marginal cost, and as such, is an important antecedent of the (subscription) purchase decision. Thus, consumption volume is a relevant yardstick for evaluating content recommendation tactics. We study whether higher volume of music samplings which can be attributed to global and local social influence results in higher consumption volume. Using data on individual-level music listening over 10 years coming from a music community website, we find that increase in sampling resulting from both, global, and local social influence results in an increase in consumption volume. We discuss implications for the entertainment businesses.

Presentation **Session Chair**
Martina Pocchiari, Erasmus University, Rotterdam, Netherlands.

Session FB07 **COVID**
07
10:15 AM - 11:15 AM

Presentation 1 **Customer Co-creation Towards a Sustainable Services Ecosystem**
Priyanka Sharma, Indian Institute of Management, Lucknow, India.
Abstract: Corona Covid-19 outbreak has led to several changes in the manner societies and businesses operated. Many countries are facing nation-wide lockdown. Such uncertainty calls for a collaborative action of various stakeholders. Furthermore, for government and organizations such as hospitals, educational institutions, e-commerce firms and providers of essential services, reliance on technology and digitization has increased manifold. While most of the prior research has focussed on co-creation in the context of new product development, the present work develops a framework to build a sustainable services ecosystem. Service Dominant Logic provides a system perspective for service creation. However, the antecedents of value co-creation are not explored sufficiently in a societal context. To address the gaps in the marketing literature, an extensive literature review and study of recent news articles was followed by expert interviews of supply side actors (firm managers, shopkeepers, teachers, university administrators) and demand side actors (students, general public and volunteers) to understand their perspectives regarding service co-creation and the utility of technology and digitization. Content analysis of interview scripts indicates a prominent role of boundary spanners between the suppliers and customers as service co-creation enablers. It also highlights some of the relational and technological enablers and barriers for the customers (e.g., altruism) and firms (e.g, ICT capabilities), leading to a three-level conceptualization of customer co-creation in the services context. Finally, the outcome is assessed in terms of economic, social and experiential value.

Presentation 2 **How Long Should Social Distancing Last? Predicting Time to Moderation, Control, and Containment of COVID-19**
Ashish Sood[1], **Nitish Sood**[2], Gerard Tellis[3], [1]University of California Riverside, Riverside, CA, [2]Medical College of Georgia, Alpharetta, GA, [3]University of Southern California, Los Angeles, CA
Abstract: Lockdowns and stay-at-home orders in response to the Covid-19 pandemic have raised an urgent question in peoples' minds, "How long must these restrictions last?" We propose two metrics of the spread of disease to answer this question: **daily growth rate** and **time to double** cumulative cases. These metrics enable three simple, intuitive, and actionable benchmarks to target: **Moderation, Control, and Containment** (growth < 10%, 1%, and .1% respectively). In addition, we define action or intervention as massive testing and quarantine, stay-at-home orders, or lockdowns. An analysis of top 35 countries and 26 states of the US affected by the epidemic as of end- March yield the following results. Any moderation or slowdown has so far been due only to aggressive intervention. Countries take an average of about three weeks to act. However, even aggressive intervention does not show immediate results. Countries take an average of about three weeks to moderate and six and a half weeks to control the spread of the disease after aggressive intervention. Substantial differences exist between large and small and Asian and European countries. Using these findings, we predict the likely dates of moderation and control for specific countries and States of the US. In the absence of a vaccine, cure, or massive testing and quarantine, lockdowns and stay-at-home orders will need to last for months.

Presentation 3 **Why Did US Governors Delay Lockdowns Against COVID-19? Disease Science vs Learning, Cascades, and Political Polarization**
Ashish Sood[1], Nitish Sood[2], Gerard Tellis[3], [1]University of California Riverside, Riverside, CA, [2]Medical College of Georgia, Alpharetta, GA, [3]University of Southern California, Los Angeles, CA
Abstract: As COVID-19 ravaged the US in the first quarter of 2020, the US lacked a uniform mandatory policy for containing its spread. Governors facing enormous opposing pressures from businesses and medical professionals adopted various policies, especially lockdowns. The authors statistically analyze the ensuing variance in governors' decisions as a function of four predictors and several control variables. They draw their four predictors from medical science and behavioral theories of political polarization, social learning, and information cascades. The conventional wisdom is that, following medical science, governors ordered lockdown primarily on the percent of their state's population infected with COVID-19. Contrary to this premise, the authors find other variables have higher influence including the following: 1) The political affiliation of the governor had a big effect on the hazard of a lockdown - on any day, a democratic governor was three times more likely than a republican governor to order a lockdown. 2) Social learning played an important role. Governors of states afflicted later by COVID-19 acted much faster than those who were afflicted earlier; for every day later COVID-19 started in a state, a governor was 1.4 times more likely to order a lockdown. 3) Actions of some governors triggered mini-cascades, sparking multiple governors to order lockdowns in their states in the next three days. 4) The percentage of the state's population infected with COVID-19 (a measure of belief in the science of disease transmission) had a weak effect on the governors' decisions.

Presentation 4 **The Price of Delay in Response to Covid-19: Natural Experiments Shows Delays in Lockdown Spike Total Cases**
Gerard J. Tellis[1], Ashish Sood[2], Nitish Sood[3], [1]University of Southern California, Los Angeles, CA, [2]University of California, Riverside, CA, [3]Medical College of Georgia, Alpharetta, GA
Abstract: Governors' of US States ordered mandatory lockdowns at different dates across the US. The authors identify cohorts of similar neighboring states with different lockdown dates. The authors analyze Covid-19 penetration per million population within these cohorts, adjusting for the start date of the disease in each state. The resulting natural experiments show that delays in lockdown spike penetration of the disease. For example, **a two week delay** in locking down one state (Tennessee), leads to about 300 more cases than neighboring Kentucky, equaling a 50% increase, as of April end. Not locking down a state at all relative to a similar neighboring one that does so, also leads to an increase in the penetration of the disease, as of April end. The absolute increase appears modest, ranging from about 300 to 3,000 cases, due to the relatively smaller sizes of states involved in the natural experiment. However, the percentage increases are large, varying from about 45% to 120%. In addition, one natural experiment between one state that had a huge social mixer (Mardi Gras in Louisiana, attracting millions of tourists over two weeks) and one similar neighboring state without such an event, shows a big increase of almost 4,000 cases amounting to a huge 180% increase in the penetration of the disease. These findings suggest that policy regarding response to pandemics should be informed by Federal agencies and scientists with the resources to forecast pandemics, rather than be left solely to state governors or local officials who lack such resources.

Presentation **Session Chair**
Ashish Sood, University of California Riverside, Riverside, CA

Session FB08 **Platforms I**
08
10:15 AM - 11:15 AM

Presentation 1 **Cross-play: The Impact Of Direct Network Effects On Compatibility Decisions**
Paul Parker, INSEAD, Fontainebleau, France. Contact: paul.parker@insead.edu
Abstract: In technology related industries, such as telecommunications, social media, and video games, firms sell platforms with associated networks of users. Consumers making purchase decisions value platforms with large install bases and then, after purchasing, make engagement decisions based on the number of other active users. Each firm, however, faces a trade-off. A firm can choose to make its user network compatible with those from other firms, to increase user engagement, at the risk of losing platform market share to firms with smaller networks. This paper develops a structural demand model that evaluates the impact of direct network effects on consumer purchase and engagement decisions and a supply model that captures the compatibility decisions considered by firms facing trade-offs between sales and user engagement. These concepts are explored within the context of the video game industry where firms sell platforms (consoles) and tied products (games) to consumers that make both purchase and usage decisions. This paper utilizes individual-level data from one of the most popular online multiplayer games, Fortnite, during the time-span when the platform market leader, Sony, enabled network compatibility with its direct competitor, Microsoft. Results from the demand model show that direct network effects positively affect both consumer platform purchase utility and engagement. Using the demand-side estimates and Sony's compatibility decision timing, counterfactual supply simulations determine the monetary value of user engagement for the firm.

Presentation 2 **Matching And Making In Matchmaking Platforms: A Structural Analysis**
Debjit Gupta[1], Juncai Jiang[2], Dipankar Chakravarti[3], [1]Virginia Tech, Blacksburg, VA, [2]Virginia Tech, Blacksburg, VA, [3]Virginia Tech, Ellicott City, MD
Abstract: Matchmaking platforms, whether online or offline, help users reach bilateral agreements and engage in mutually beneficial interactions. A common problem on such platforms is that platform and users' interests may not coincide. For instance, competitors in online gaming platforms may seek matches with less skilled competitors so as to maximize their chances of winning. However, even if competitors may seek such imbalance, the platform may seek to create balanced matches that enhance the enjoyment of other parties (e.g., viewers) who often are a major source of platform revenue. We build a structural model to investigate the determinants of users' matching decisions and the impact of these decisions on platform revenue. We estimate the model using a Bayesian approach based on a novel dataset on fighters and bouts collected from the Ultimate Fighting Championship (UFC). We use counterfactual experiments to examine several methods of resolving potential conflicts of interest between the platform and users (e.g., dictating matches, making side payments to promote desirable matches, or changing existing tiering systems). The model provides conceptual, methodological and managerial insights regarding the design of one-sided matching market models.

Presentation 3 **Does Equity Crowdfunding Hurt Or Help Reward-based Crowdfunding? Analysis Of A Natural Experiment In The Canadian Market**
Jihoon Hong, Dinesh Puranam, Gerard J. Tellis, University of Southern California, Los Angeles, CA
Abstract: While funds raised on equity crowdfunding surpassed that of reward-based crowdfunding as of 2017 globally ($840.12 M vs. $707.61 M), little is known about the relationship between these two different crowdfunding formats. This study is the first to examine the causal impact of the introduction of equity crowdfunding on incumbent reward-based crowdfunding platforms. Using data from Kickstarter and applying the synthetic control method, we exploit a natural experiment in the Canadian crowdfunding markets. We find that: (i) previously successful creators' participation decreased by 43.2%, (ii) successful projects dropped by 11.6 %, (iii) the delivery of projects declined by 5.8%, and (iv) funds raised in total declined by 11.6%. We also find consistent results in the U.S. crowdfunding market. Overall, equity crowdfunding is a substitute for reward-based crowdfunding. Our findings suggest the implications to project backers, the incumbent reward-based crowdfunding platforms, and policymakers.

Presentation 4 **The Effect Of Streaming Adoption On Artists' Production Of Music**
Nazli M. Alagoz, George Knox, Hannes Datta, Tilburg University, Tilburg, Netherlands. Contact: n.m.alagoz@uvt.nl
Abstract: Digitization has changed the way content is produced, distributed, and promoted. In entertainment and cultural industries like music, streaming has emerged as the predominant business model to connect producers with consumers. Platforms such as Spotify or Apple Music have affected how and what consumers listen to, by offering a vast library of music and lowering search costs through recommendations and playlists. Streaming platforms have also changed how producers earn an income. It replaced music album and single sales by streaming income where artists receive royalties when users play more than 30 seconds of a song. In this paper, we empirically assess how artists have responded to the streaming business model. Specifically, we investigate how artists have changed their production of new music (defined as releases of singles or albums) before and after they start distributing music on Spotify. Using a unique and comprehensive panel dataset, we assess how Spotify impacts (1) the timing of releases, (2) the "size" of releases, i.e., the number of tracks and length of songs, and (3) the content of those releases, i.e., the acoustic features of tracks (e.g., tempo, valence). Given the incentives that Spotify imposes on artists through their revenue model, we expect artist adoption of Spotify to lead to more frequent, shorter releases. Indeed, among our preliminary results, we find that adoption results in a decreased average duration of releases, a higher number of tracks, and shorter release intervals.

Presentation **Session Chair**
Nazli Alagoz, Tilburg University, Tilburg, Netherlands.

Session FBC09 **Gary Lilien ISMS-EMAC-MSI 2020 Practice Prize Finalists**
09
10:15 AM - 12:30 PM

Presentation 1 **Machines and Humans: Field Experiments on Generating Business Value from Artificial Intelligence Chatbot in a Financial Services Company**
Xueming Luo[1], Siliang Tong[1], Zheng Fang[2], Zhe Qu[3], [1]Temple University, Philadelphia, PA, [2]Sichuan University, Sichuan, China; [3]Fudan University, Shanghai, China.
Abstract: Companies face substantial challenges to reap the business value from artificial intelligence (AI), since consumers and employees are skeptical about AI-powered technologies. This research tackles several acute challenges faced by a Fintech company that has implemented AI chabots. Data from randomized field experiments suggest that AI bots are as effective as the leading human agents but with higher efficiency and lower marginal costs, revealing the front-office customer-facing capability of AI for sales call automation. However, disclosing the AI chatbot's machine identity to customers significantly reduces their purchase rates, attesting to the challenge of consumer aversion to AI. Further, AI bots outperform the lagging human agents because the former engenders more consistent and competent speech patterns (i.e., lower volatility of voice amplitude and speed in how to say and higher selling competence in what to say). Such results affirm the back-office employee-facing capability of AI for the purposes of voice quality control and human agent training toward higher employee productivity and customer service quality. Upon implementing our research recommendations and optimization models, the company experienced substantial lifts in the conversion rates of outbound financial service calls, e-commerce sales, and loan collection businesses.
10:15 AM - 12:30 PM

Presentation 2 **CBCV: Reshaping the Practice of Corporate Valuation Using a Customer- Driven Approach**
Daniel McCarthy, Goizueta Business School, Emory University, Atlanta, GA
Abstract: Marketing academics have spent considerable energy trying to convince a key set of stakeholders of their ability to value marketing assets - investors and financial analysts. Towards this end, "customer-based corporate valuation" (CBCV), which explicitly links the value of a firm's customer base to its future cash flows, has emerged as a promising methodology. In this paper, I assess and enhance the real-world utility of CBCV in five ways. First, I estimate the underlying models of customer behavior upon a more diverse collection of customer-related disclosures, allowing me to specify models that incorporate cross-cohort dynamics, duration dependence, and unobserved heterogeneity. Second, I apply these models to all public company analyses I have ever performed for which implied fair valuations were meaningfully different from then-current stock prices on an ex-ante basis. These seven companies operate across a wide variety of industries and business settings, supporting CBCV's robustness and portability. Third, I provide a broader model validation: in addition to measures of in- and out-of-sample fit, I show that simple trading rules utilizing the proposed valuation estimates would have generated a return in excess of the market. Fourth, I enhance the accessibility of the models by providing an Excel-based decision tool for estimating the proposed model for subscription-based firms. Finally, I provide evidence of the significant impact of these analyses on stock prices, media, Wall Street analyst reports, securities law, and regulatory bodies.
10:15 AM - 12:30 PM

Presentation 3 **The Comprehensive Effects of Sales Force Management:**
A Dynamic Structural Analysis of Selection, Compensation, and Training
Doug J. Chung[1], Byungyeon Kim[1], Byoung G. Park[2], [1]Harvard Business School, Boston, MA, [2]University at Albany, Albany, NY
Abstract: This study provides a comprehensive model of an agent's behavior in response to multiple sales management instruments, including compensation, recruiting/termination, and training. The model takes into account many of the key elements that constitute a realistic sales force setting—allocation of effort; forward-looking behavior; present bias; training effectiveness; and employee selection and attrition. By understanding how these elements jointly influence agents' behavior, the study provides guidance on the optimal design of sales management policies. A field validation, by comparing counterfactual and actual outcomes under a new policy, attests to the accuracy of the model. The results demonstrate a trade-off between adjusting fixed and variable pay; how sales training serves as an alternative to compensation; a potential drawback of hiring high-performing, experienced salespeople; and how utilizing a leave package leads to sales force restructuring. In addition, the study offers a key methodological contribution by providing formal identification conditions for hyperbolic time preference. The key to identification is that, under a multi-period nonlinear incentive system, an agent's proximity to a goal affects only future payoffs in non-pecuniary benefit periods, providing exclusion restrictions on the current payoff.

Presentation **Session Chair**
Koen Pauwels, Ozyegin University, Newton, MA

Session FB10 **ESTIMATING CAUSAL EFFECTS OF MARKETING ACTIONS**
10
10:15 AM - 11:15 AM

Presentation 1 **Data-driven Decision-making In Sales: How Marketing Analytics Can Enhance Sales Performance**
Minjee Sun, Avi Goldfarb, Mengze Shi, University of Toronto, Toronto, ON, Canada. Contact: minjee.sun@rotman.utoronto.ca
Abstract: Technology developments in marketing analytics enable salesforces to be data-driven. However, we have little empirical understanding of the connections between marketing analytics and actual sales performance. Using data from a global B2B information technology company, we investigate whether the adoption of a new analytics tool affected performance in sales. On average, marketing analytics adoption enhances sales achievement by 12%. This surge in performance is mainly driven by sales agents who did not achieve their sales quota (i.e., low-ability) before the new analytics tool became available. By further exploring the performances in the stages of the sales process, we found that marketing analytics promoted low-ability sales agents to pursue more leads from existing customers and supported high-ability sales agents to win more sales deals with pursued leads, primarily from new customers. The findings imply that by harnessing the data-driven tool, low performers are able to seize opportunities that they might have been missed and high performers can enhance their sales winning ratio, resulting in more clinched deals.

Presentation 2 **The Effect of Marijuana Legalization on Opioid Prescriptions**
Hayoung Cheon, University of Michigan, Ann Arbor, MI
Abstract: The misuse of prescription opioids over the last two decades has snowballed into a national crisis. Simultaneously, there has been a wave of marijuana legalization at the state level. Given that, at the individual level opioids and marijuana can be used as substitutes, there has been growing interest in testing this empirically. In particular, we want to determine whether the legalization of marijuana has an impact on the (over)consumption of opioids. The change in the external environment that allows us to identify this impact is the temporal distribution of marijuana legalization across states. Using a difference-in-differences approach with data at disaggregate (county) level, we investigate the legalization of marijuana on three aspects of opioid consumption - the number of prescriptions, the potency of prescriptions and the amount of supply per prescription.

Presentation 3 **The Minimum Wage And Consumer Nutrition**
Michael Patrick Palazzolo[1], **Adithya Pattabhiramaiah**[2], [1]University of California - Davis, Davis, CA, [2]Georgia Institute of Technology, Atlanta, GA
Abstract: The USDA estimates that 1 in 9 U.S. households is “food insecure”: unable to purchase sufficient, or healthy food. Public policy advocates and politicians have pointed to the prevailing federal minimum wage as a culprit, labeling it a “starvation wage.” This paper examines whether and to what extent increases to the minimum wage can improve the quantity and nutritional quality of food purchased by minimum wage earners. We show that households earning the minimum wage increase their calories purchased in response to minimum wage revisions, primarily during the weeks of the month in which they had previously been more budget-constrained. By contrast, households do not improve the nutritional content of calories purchased in response to the minimum wage. Why? Are households unable to do so, perhaps because past minimum wage increases were insufficiently large? Or are households disinclined to change what they eat? We find more support for the latter explanation. Overall, our findings suggest that while increasing the minimum wage may help households afford much needed calories, it is not a panacea for food insecurity. Policy-makers aiming to promote healthier eating may need to leverage alternative policy instruments shown to do so, such as “sin taxes.”

Presentation **Session Chair**
Venkatesh Shankar, Texas A&M University, College Station, TX

Presentation **Session Chair**
Adithya Pattabhiramaiah, Georgia Institute of Technology, Atlanta, GA

Session FB11 **ISMS Doctoral Prize winners**
11
10:15 AM - 11:15 AM

Presentation 1 **Product Design in Online Education for Children**
Dinara Akchurina, Paulo Albuquerque, INSEAD, Fontainebleau, France.
Abstract: The purchase and usage of products and services are frequently not driven by the same motives, in part because in many categories the user is not the buyer. In this paper, we study usage and purchase decisions in the context of an online educational platform for children, where the completion of math lessons is rewarded with access to gamified activities. To explain usage, we develop a multiple discrete-continuous time allocation model that accounts for the existence of a conditional activity, i.e., when the completion of one activity - a lesson - allows access to another activity- a game. The child's usage decisions in turn influence their parent's subscription decision. We estimate the model on data from two online field experiments involving more than 21,000 pairs of children and parents. In counterfactual simulations, weshow that alternative customized product configurations, such as increased time of core math content and limiting access to gamified content, can reduce the misalignment between parent and child preferences, leading to increases in subscriptions of around10%, without a significant decrease in child participation.

Presentation 2 **Optimizing User Engagement through Adaptive Ad Sequencing**
Omid Rafieian, University of Washington, Seattle, WA
Abstract: Mobile in-app advertising has grown exponentially in the last few years. In-app ads are often shown in a sequence of short-lived exposures for the duration of a user's stay in an app. The current state of both research and practice ignores the dynamics of ad sequencing and instead adopts a myopic framework to serve ads. In this paper, we propose a unified dynamic framework for adaptive ad sequencing that optimizes user engagement in the session, e.g., the number of clicks or length of stay. Our framework comprises of two components - (1) a Markov Decision Process that captures the domain structure and incorporates inter-temporal trade-offs in ad interventions, and (2) an empirical framework that combines machine learning methods such as Extreme Gradient Boosting (XGBoost) with ideas from the causal inference literature to obtain counterfactual estimates of user behavior. We apply our framework to large-scale data from the leading in-app ad-network of an Asian country. We document significant gains in user engagement from adopting a dynamic framework. We show that our forward-looking ad sequencing policy outperforms all the existing methods by comparing it to a series of benchmark policies often used in research and practice. Further, we demonstrate that these gains are heterogeneous across sessions: adaptive forward-looking ad sequencing is most effective when users are new to the platform. Finally, we use a descriptive approach to explain the gains from adopting the dynamic framework.

Presentation **Session Chair**
Catherine Tucker, Massachusetts Institute of Technology, Belmont, MA

Friday, June 12, 2020
Session "FC"
11:30 AM - 12:30 PM

FC01. Machine Learning, Artificial Intelligence, and Causal Inference in Marketing VII

FC02. Digitization 1: Search and Consumption

FC03. Game Theory: Pricing

FC04. Global Retail Strategies: Review and New Directions

FC05. Ad Design and Message

FC06. Special Session on Reviews

FC07. Marketing for Good: The Impact of Marketing Interventions in Emerging Markets

FC08. Platforms II

FC10. Bayesian Dynamics and Time Series

FC11. Research in Crowdfunding and Success

Session FC01 **Machine Learning, Artificial Intelligence, and Causal Inference in Marketing VII**
01
11:30 AM - 12:30 PM

Presentation 1 **I Hear You: Does Quality Improve with Customer Voice?**
Siddhartha Sharma[1], Uttara Ananthakrishnan[2], Davide Proserpio[3], [1]Carnegie Mellon University, Pittsburgh, PA, [2]University of Wisconsin-Madison, Madison, WI, [3]USC Marshall, Los Angeles, CA
Abstract: In this paper, we empirically study whether firms improve their quality based on reviews left by their customers in a dynamic quality environment. We do so by analyzing the US hotel industry using data from two major online review platforms: TripAdvisor and Expedia. Using management response as a proxy for whether hotels read and listen to consumer reviews, and a difference-in-differences strategy, we demonstrate that hotels make improvements in quality by paying attention to the reviews they receive. Moreover, we show that these improvements are primarily made by low-rated hotels that have more room for improvement, and by chain hotels likely because of their lower operational marginal cost. To pin down the underlying mechanism, we analyze the text of reviews and responses using novel tools for natural language processing and show that: (i) hotels that listen to customers improve on issues that are frequently mentioned in their reviews, and (ii) hotels that use canned responses are less likely to see improvements in quality. Overall, our results suggest that online user-generated reviews form a feedback mechanism through which consumers make themselves heard by businesses and contribute to changes in the quality of those businesses.

Presentation 2 **Nowcasting in Chatbot Design: Leveraging Service Journey Patterns to Improve User Satisfaction**
Yang Wang[1], Yuran Wang[1], Xueming Luo[1], Xiaoyi Wang[2], [1]Temple University, Philadelphia, PA, [2]Zhejiang University, Zhejiang, China.
Abstract: We partner with a chat bot software company to transform a government agency service bot from a free input search-based bot to a guided conversation bot to test the implications of these two dominant bot architectures on end-user satisfaction. This change is particularly important in bureaucratic agencies with specialized technical verbiage that may be difficult for the end user to incorporate independently in their free-form questions. Suggesting likely questions reduces the burden on the end user's question construction while decreasing the likelihood of the bot's failure in the natural language understanding step, leading to overall gains in efficiency and satisfaction. Specifically, we test and design a variety of machine learning algorithms that serve as the next question prediction engine that the bot uses to guide the conversation. The resulting prediction algorithms sheds light on the knowledge structure contained in the bot's knowledgebase by learning from the common sequences of end users' service journey. We test the gains to out of sample prediction accuracy for algorithms based on purely Markovian predictions, contextual predictions, and sequenced-contextual predictions in the design stage and conduct A/B tests to demonstrate user satisfaction gains in the implementation stage.

Presentation 3 **Digital Verification Network and Inclusive Access to Credit: Evidence from Equifax Inc.**
Meng Liu[1], Tat Chan[1], Naser Hamdi[1], Zhenling Jiang[2], Xiang Hui[1], [1]Washington University in St. Louis, St. Louis, MO, [2]Georgia State University, Atlanta, GA
Abstract: To mitigate asymmetric information in the consumer lending market, lenders typically rely on credit information to grant loans. In this paper, we study how the digitization of employment and income verification enables inclusive access to credit by further reducing asymmetric information over and beyond the use of credit scores. We use a unique proprietary dataset that covers all inquiries of employment verification to Equifax that are associated with auto loan applications to empirically investigate how loan outcomes change after the employers of auto loan applicants joined the digitization system of Equifax. We find that the loan origination rate and the delinquency rate have both increased. The increases disproportionately come from deep subprime and subprime consumers. Interest rates have also become slightly higher. Finally, digital verification will increase lenders' profit, as the negative impact of the increased delinquency rate is more than offset by the growth in loan origination. These findings are consistent with a model where instant access to verified data helps reduce the time and effort required to gather the information, and thus allows for an expanded access to finance for marginal consumers who would not have obtained a loan without digital verification. Our results help inform managers and public policy-makers on ways of improving economic efficiency and lenders' profit in the consumer lending market, while promoting inclusive access to credit.

Presentation 4 **Impact of Human-AI Supervisor Assemblages on Worker Productivity: A Field Experiment**
Xueming Luo[1], Narayan Ramasubbu[2], Zheng Fang[1], He Peng[3], [1]Temple University, Philadelphia, PA, [2]University of Pittsburgh, Pittsburgh, PA, [3]Fudan University, Shanghai, China.
Abstract: Despite the promises of artificial intelligence (AI), there are concerns from both employees and managers about adopting AI at workplaces. Examining how firms can integrate AI into performance management systems (PMS), this research focuses on the impact of various human-AI supervisor assemblages on employees' task performances and relations with human bosses. We utilize data from a field experiment on customer service employees in a fintech company who are randomly assigned to receive job performance feedback from human managers only, an AI bot only, or human-AI supervisory assemblages. A unique feature in our experiment is that the assemblages encompass a dual human-and-AI configuration (where employees receive feedback from both human managers and an AI bot in parallel) and a shadow-AI-human-face configuration (where employees receive feedback that is generated by an AI bot but delivered by human managers). The results suggest that relative to conventional human supervision, a dual human-and-AI design negatively impacts employee task performance, whereas a shadow-AI-human-face design positively impacts employee task performance. Additional results reveal that employees under the dual (shadow-AI) configuration make more (fewer) mistakes on the job and induce more (fewer) customer anger incidences. Explorations of the psychological mechanisms support that a dual condition with both AI and human supervision in parallel leads employees to perceive more confused leadership and feedback, lower expertise power of their managers, and lower employee-manager relationship quality in a vicious cycle. In contrast, the shadow-AI design significantly improves employees' perceptions of feedback accuracy and consistency, willingness to proactively seek feedback, and organizational commitment in a virtuous cycle. These findings suggest that firms should prudently design the human-AI supervisory assemblages. As a double-edged sword, AI-based PMS should be deployed in the shadows to empower human managers, rather than to displace or compete with them, to achieve higher worker productivity and healthier employee-manager relationships.

Presentation **Session Chair**
Xueming Luo and Siliang Tong, Temple University, Philadelphia, PA

Session FC02 **Digitization 1: Search and Consumption**
02
11:30 AM - 12:30 PM

Presentation 1 **Consumer Search in the U.S. Auto Industry: The Value of Dealership Visits**
Elisabeth Honka, Daniel Yavorsky, UCLA Anderson School of Management, Los Angeles, CA
Abstract: In many markets, consumers visit stores and physically inspect products before making purchase decisions. We view the inspection of a product at a retail location as a search for product fit. We quantify the cost and benet from searching for product fit using a discrete choice model of demand with optimal sequential search. In these models, the benefit of searching is measured by the standard deviation of the product fit and has, heretofore, been fixed to one for identification purposes. With an exogenous search cost shifter, both the cost and benefit of searching can be separately identified. Our empirical setting is the U.S. automotive market. We assemble a unique data set containing individual-level smartphone geolocation data that inform us about dealership visits. We also obtain information on new vehicle purchases from proprietary DMV registration data. Our exogenous cost shifter is the distance a consumer must travel to visit a dealership. Our results show that the benefit provided by dealerships to consumers is substantial. Failure to estimate the standard deviation of the product fit leads to biased search cost and consumer surplus estimates and to inaccurate predictions regarding the number of searches consumers conduct.

Presentation 2 **Search Revisits**
Chu (Ivy) Dang[1], Raluca Ursu[2], Pradeep Chintagunta[3], [1]University of Hong Kong, Hong Kong, China; [2]New York University, New York, NY, [3]University of Chicago, Chicago, IL
Abstract: Most of the existing literature on consumer search tends to ignore consumers' repeated visits to previously searched items (search revisits). In this paper, we leverage a rich clickstream data set on hotel searches and document both the extent and the nature of consumers' revisit behavior. We find that revisits are common, constituting 22.2% of searches (49.2% of sessions) and, more interestingly, that consumers choose to revisit items that are more similar to the most recent item searched, likely because of ease of comparison. Further, we observe two types of revisit behaviors: 1) looking at information previously obtained (recall); and 2) searching for new information on previously searched options (continue search). Also, we find that consumers are strategic in choosing between "recall" and "continue search," depending on whether they want to eliminate or keep that item in the consideration set. We discuss these and other related findings in the context of existing search models and identify conditions under which incorporating search revisits into a model of consumer search is important. Finally, we shed light on how to formally rationalize and model search revisit behavior.

Presentation **Session Chair**
Pinar Yildirim, University of Pennsylvania, Philadelphia, PA

Presentation **Session Chair**
Georgios Zervas, Boston University School of Management, Brookline, MA

Presentation **Session Chair**
Chu (Ivy) Dang, University of Hong Kong, Hong Kong, China

Session FC03 **Game Theory: Pricing**
03
11:30 AM - 12:30 PM

Presentation 1 **Searching For Sales**
Eric Schmidbauer[1], Dmitry Lubensky[2], [1]University of Central Florida, Orlando, FL, [2]Amazon, Seattle, WA, Contact: eschmidb@ucf.edu
Abstract: What is the best pricing strategy to attract a searching consumer? We show that when facing a consumer with a participation constraint it is either optimal to commit to a single everyday low price or to use a mixed strategy over a regular price and a sale price, and we characterize the properties of the demand function under which each strategy is best. In a model with two sellers we show that when preferences for quality are sufficiently disperse, the high quality seller offers big sales and is visited first, while the low quality seller sets an everyday low price and is visited second.

Presentation 2 **Selling Exclusive Goods: The Need For Resale Markets**
Yue Li, Sriniketh Vijayaraghavan, **Paola Mallucci**, Paul R. Hoban, University of Wisconsin, Madison, WI, Contact: pmallucci@bus.wisc.edu
Abstract: For many exclusive goods, there exists a vibrant secondary market in which prices consistently exceed those originally charged by the manufacturer. However, managers appear reticent to increase the quantity produced or charge higher prices to align supply and demand. We explore the interdependence between secondary markets and consumer preferences for exclusivity. Under a rational expectations framework, we show that a monopolist can extract consumer value for exclusive goods only with an active resale market. In the absence of preferences for exclusivity or a secondary market, the firm's optimal strategy reduces to that of the standard monopolist. Further, we show that any price gap between the primary and secondary markets is driven by the secondary market commission rate, and the firm maximizes profits when this is zero. In contrast to the existing literature, we arrive at these conclusions without assuming informational asymmetries between firm and resellers or primary market frictions. For firms, this highlights the potential benefits of establishing proprietary resale markets, with incremental profits obtained through higher primary market prices and not commission payments. We show these results are robust to several alternative model specifications.

Presentation 3 **Influencers: The Power of Comments**
Matthew Selove, Cristina Nistor, Chapman University, Orange, CA
Abstract: Many customers choose products based on blogs, Instagram posts, and other information from social media influencers. Companies can pay these influencers to promote their products. We develop a theoretical model that suggests that a network of connected consumers who can give instant feedback to all current and future consumers is a powerful mechanism for ensuring truth telling in advertising. Unlike traditional models of reputation, our model suggests that large influencers are more likely to engage in deceptive advertising, whereas small influencers are more likely to be truthful.

Presentation 4 **Sequential Screening with Subscription Plans Under Two Dimensions of Consumer Uncertainty**
Bo Zhou[1], Debu Purohit[2], [1]University of Maryland, College Park, College Park, MD, [2]Duke University, Durham, NC
Abstract: Subscription plans are available in a large number of markets, e.g., health clubs, wireless service, clothing, cable, internet, music streaming, video streaming, etc. In all these settings, consumers are signing up for a period when they are uncertain about how much they expect to use the service. Consider consumers who subscribe to monthly wireless service. At the beginning of the month (i.e., the billing period), consumer face two types of uncertainties: how often or intensively they will use the service, and how much they will value each consumption experience. Depending on the specifics of the plan that is offered by the firm, consumers may choose to forego current consumption in order to save data for future use. Given these uncertainties and consumers' strategic behavior, what is the optimal subscription plan that should be offered by the firm? In this paper, we develop a dynamic model to address this issue. In particular, we allow the firm to offer a variety of multi-part plans that include the option of rolling over unused data into the next billing period.

Presentation **Session Chair**
Bo Zhou, University of Maryland, College Park, College Park, MD

Session FC04 **Global Retail Strategies: Review and New Directions**
04
11:30 AM - 12:30 PM

Presentation 1 **The Impact of Retail Environment on Luxury Consumption**
Lidan Xu[1], Ravi Mehta[2], [1]Oklahoma State University, Stillwater, OK, [2]University of Illinoise, Urbana, IL, Contact: lidan.xu@okstate.edu
Abstract: In this research, we provide detailed literature review and offer directions for future research on how retail environment affects luxury products/brands perceptions and purchase behavior. Retail atmosphere is critical for the success of luxury brands, because unlike mass-market brands, luxury brands rely heavily on the social relationships and symbolic values developed around them. Consumers not only look for high quality products, but seek holistic experience when purchasing luxury products. Hence, it is important for both researchers and managers to understand how retail experience affects consumers' brand perceptions and purchase behavior. In the current work, we examine how two key dimensions of retail environment: 1) ambient cues, and 2) social cues, affect purchase decisions for luxury brands. Within the first stream of literature, we examine the impact of each of the sensory elements, such as color, layout, music, and odor, on consumers' perception of brand image, brand attitude, and ultimately purchase behavior. Within the second stream of literature, we examine and provide a synthesis of how luxury brands use social cues in the retail setting to manage and communicate the status of the brand to consumers. Further, we offer directions for future research that can further examine not only how physical retail atmosphere can impact luxury brands, but also how virtual retail environment and new technology can impact luxury brands. As retail industry is undergoing an evolution, and luxury retail is experiencing a paradigm shift from relying on physical retail space to embracing online retailing, it is consequential to understand how marketers can leverage virtual retail environment and use new technologies, such as artificial intelligence and augmented reality, to manage luxury brands.

Presentation 2 **How do Brand-Manufacturers' and Retailers' Marketing-Mix Decisions Influence Private-Label Share? Generalizations and Future Research**
Marnik G. Dekimpe[1], Inge Geyskens[1], Kristopher Keller[2], [1]Tilburg University, Tilburg, Netherlands; [2]University of North Carolina at Chapel Hill, Chapel Hill, NC
Abstract: There is no denying that private labels (PLs) (also called store brands) are thriving. The increasing market shares of private labels have resulted in a rich stream of studies on how to increase (the retailer's objective) or how to fight PL share (the brand manufacturer's objective). To date, several authors have presented reviews of what drives PL share or consumer choice (see, e.g., Sethuraman and Gielens 2014). Although bringing some much-needed coalescence to the field, these reviews have left some recent issues unaddressed. In particular, PLs have changed drastically over the last decade and are making the transition to brands in their own rights. One of the most prominent developments is that many retailers have moved from a single, standard-tier offering to a multi-tier offering, with especially premium PLs driving PL growth. In this review, we will focus on actionable drivers of PL share. We consider marketing-mix instruments that are (primarily) under control of the retailer and others that are (primarily) under control of the manufacturer. Specifically, we will meta-analytically study the following issues: 1) How can retailers increase PL share through managing (i) the price gap with NBs, (ii) PL-promotion activity, and (iii) assortment decisions (SKU proliferation, copycatting, adding new-to-the-market SKUs)? Should they adapt their strategies to the different PL tiers? 2) How can manufacturers fight PL share through managing (i) NB advertising, (ii) NB promotions, and (iii) product innovations? Do certain defense strategies work better against some tiers than others? 3) Is there evidence of shifts in effectiveness across marketing-mix strategies over time? Finally, do strategies that work well in developed markets transfer to emerging markets?

Presentation 3 **Food Retailing in Developing Countries: Review of Insights and New Directions**
Timothy Richards[1], Simba Pasirayi[2], [1]Arizona State University, Mesa, AZ, [2]Salisbury University, Salisbury, MD
Abstract: Most of the world's population lives in developing countries -- some 83.9% by recent estimates (World Population Review 2019) -- and is likely to be responsible for a larger share of global economic growth in the near and longer term (United Nations 2019). Yet, despite dramatic changes in the last 20 years (Barrett, et al. 2019; Nath, et al. 2019) food retailing differs substantially between the developing and developed world. A modern and efficient retailing sector is a precondition for growth as retailing is critical to the economic welfare of a nation's consumers. Retailers provide the key economic signals to the rest of the supply chain, calling forth the type and variety of products demanded by consumers, at the prices they are willing and able to pay. Understanding the process of retail-format adoption and change among developing countries is critically important from the perspective of the retailers themselves. Gaining a better understanding of how retailing differs in developed and developing countries is thus imperative from a managerial as well as an economic-policy perspective. We aim to examine the existing empirical literature for evidence of trends in food retailing in the developing world, synthesize relevant research from the retailing, supply chain, and development-economics literatures in order to identify areas of concern and research interest, highlight the need for better data in this area, and suggest areas of research that can provide insight on potential opportunities for improvement, both from a policy and a managerial perspective.

Presentation **Session Chair**
Timothy Richards, Arizona State University, Mesa, AZ

Session FC05 **Ad Design and Message**
05
11:30 AM - 12:30 PM

Presentation 1 **Analyzing Content Analysis Of Video Advertisements And Its Effects On Consumer Engagement**
Eunhee (Emily) Ko[1], Young Woong Park[2], [1]Northwestern University, Evanston, IL, [2]Iowa State University, Ames, IA, Contact: eunhee.ko@northwestern.edu
Abstract: As video consumption on social media becomes a dominant part of consumer activities, marketing firms are beginning to allocate a greater portion of their budgets to marketing communication on social networks and use the platforms as their main channel for distributing video advertisements. Compared with advertisement in traditional media, such as TV or radio, the content or form of the ad (e.g., video length, content types) is more flexible in the new media platforms. Accordingly, there has been growing uncertainty around them, and the creation of effective content for social media marketing campaigns has become a challenge for marketers. The authors propose that underlying latent structures from multiple interdependent sequences in video advertisements are predictive for consumer engagement. This study employs a proprietary, frame-level, single-source data set and develops underlying sequential structures in video ads (e.g., object sequences, emotion sequences) and models where the structures are taken into account in explaining consumer responses to video ads while controlling for low-level features from the videos and the time they are watched. Lastly, the authors identify several challenges in this field and put forward recommendations for future research.

Presentation 2 **Research On The Influence Of Digital Presentation Forms In Advertising Slogans On Consumers' Purchase Intention:eye-based Evidence**
LI Jiang, Southwest Jiaotong University, Chengdu, China. Contact: 114442047@qq.com
Abstract: This experiment uses 2 (digital presentation form: proportional ,descriptive) * 2 (interpretation level: high , low) experimental design. Through eye movement experiments, observe the consumer's gaze duration to the advertising material, and research the consumer's information processing fluency. And consumer willingness to buy. The research results show that the theoretical design and implementation of eye movement experiments in the slogan's digital presentation and interpretation level are as follows: 1) The digital presentation in the slogan positively affects consumers' willingness to buy, and the ratio of descriptive presentation is proportional The type of presentation can more affect consumers' purchase intention; 2) the digital presentation in the advertising message positively affects the smoothness of information processing of consumers, and the information processing fluency of descriptive presentation is higher than that of proportional presentation; 3) consumption The information processing fluency of the digital presentation form in the slogan positively affects its purchase intention, and the consumer's information processing fluency has an intermediary effect between the digital presentation form in the slogan and the consumer's purchase intention; 4) the interpretation level The effect of digital presentations in advertising slogans and consumers' purchase intention has a significant moderating effect. For consumers with a high level of interpretation, when the digital proportional representation (abstract) in the slogan matches the consumer's abstract cognitive schema, the consumer's willingness to buy is higher than the descriptive digital representation; for consumers with a low interpretation level When the digital descriptive representation (representation) in the slogan matches the consumer's figurative cognitive schema, the consumer's willingness to buy is higher than the proportional digital representation.

Presentation 3 **Different Advertising Contents For Different Audiences: Evidence From A Field Experiment On Social Media**
Anna M. Hepp[1], Przemyslaw Jeziorski[2], [1]Technical University of Munich, Munich, Germany; [2]University of California at Berkeley, Berkeley, CA, Contact: anna.hepp@tum.de
Abstract: Advertising on social media offers countless opportunities for firms to reach potential consumers. Given these opportunities, firms need to understand which form of advertising accomplishes desired outcomes most effectively. Advertising can vary, among others, with regard to its content and the targeted audience. Scholars distinguish between two broad categories of advertising content on social media: directly informative content and emotional, brand-personality related content. Directly informative content is associated with more clicks, while emotional, brand-personality related content tends to increase user engagement, manifested, e.g., in likes or comments. However, it remains unclear which type of advertising content maximizes user engagement of social media users who have signaled a particular interest for advertised products.
In collaboration with a do-it-yourself brand, we conduct a field experiment on Facebook, generating 300,000 individual contacts. In a two-by-two experimental design, we explore the behaviors of interested users and the general audience in response to directly informative versus emotional, brand personality-related advertising content. We measure the difference in user behavior of interested users compared to the general audience and anticipate higher levels of user engagement among them, even in response to informative content.
This study makes two contributions. First, we contribute to the literature on advertising content by adding consumer-level interests to the analysis of informative versus emotional, brand personality-related content on social media. Second, this study provides marketing executives with insights on advertising content and effective targeting of different audiences, helping to improve guidelines for advertising on social media.

Presentation 4 **The Effectiveness Of Visual And Textual Content Of Thumbnails On Online Video Selection**
Kyungjin Nam, Hye-jin Kim, Korea Advanced Institute of Science and Technology, Daejeon, Korea, Republic of.
Abstract: The advertising impact of images and texts on customer's choice has expanded to online environments including e-commerce websites and social media. Though the role of thumbnails and titles has never been more important in this era of online video content, there is little literature about the effectiveness of visual and textual preview of online videos. Therefore, the purpose of this study is to investigate what features of the image and text combination within a thumbnail, together with the title, play important roles in the selection (view counts and likes) of online videos. Our context is Gaming Video Content (GVC) industry, which has been growing rapidly in recent years. Several studies investigated the motivations of watching others playing games on live streaming service, however, the studies are mainly focused on the motivations rather than the choice of online video clips. At the same time, less is known about the Video-On-Demand format, where the

selection of video is more dependent on thumbnail images and titles compared to live streaming videos. Drawing upon the Elaboration Likelihood Model (ELM) of persuasion, a dual process theory of attitude formation and change led by central and peripheral routes, we measure variables including an object-level visual complexity, pixel-level visual complexity, social complexity, textual complexity, content consistency, and image-text similarity. Data - titles, thumbnails, view counts, likes, comments, etc. - has been collected from the videos of Top 250 gaming channels on YouTube. Machine learning approaches such as deep learning and text mining are employed to handle the features in measurable forms.

Presentation **Session Chair**
Kyungjin Nam, Korea Advanced Institute of Science and Technology, Daejeon, Korea, Republic of.

Session FC06 **Special Session on Reviews**
06
11:30 AM - 12:30 PM

Presentation 1 **Can Consumers Distinguish Between Vertically and Horizontally Oriented Comments in Reviews?**
Nah Youn Lee[1], Bryan K. Bollinger[2], Richard Staelin[3], [1]Duke University, Fuqua School of Business, Durham, NC, [2]NYU Stern School of Business, New York, NY, [3]Duke University, Durham, NC
Abstract: This paper examines the differential impact on firm sales of variances in the quality and taste comments found in online customer reviews. First, we develop an analytic model incorporating heterogeneous consumer tastes and stochastic realizations of product quality, and show increased variance in consumer reviews about taste mismatch, all else equal, can increase subsequent demand when ratings are low and quality variance is high. In contrast, increased variance in quality, all else equal, always decreases subsequent demand. Since these theoretical demand effects are predicated on the assumption that consumers can differentiate between the two sources of variation in ratings, we next demonstrate this ability using online survey data associated with 5,000 text reviews. Information coming from this survey is then used to construct stimuli for a controlled laboratory experiment that finds strong support for our predictions. Next, we generalize these findings by analyzing over 283,000 reviews for more than 4,000 restaurants. Using the survey data from the 5,000 reviews, we train a classifier model that uses a bag-of-words model to predict the degree to which each review is concerned with quality and/or taste mismatch costs. Finally, after merging this data with another dataset containing restaurant annual sales, we estimate the effects of the two types of variance in overall ratings on restaurant sales. We again find support for our theoretical results.

Presentation 2 **Alone, Together: Product Discovery Through Consumer Ratings**
Tommaso Bondi, Cornell Tech & Johnson, New York, NY
Abstract: Consumer ratings have become a prevalent driver of choice. I develop a model of social learning in which ratings can inform consumers about both product quality and their idiosyncratic taste for them. Depending on consumers' prior knowledge, I show that ratings relatively advantage lower quality and more polarizing products. The reason lies in the stronger positive consumer self-selection these products generate: to buy them despite their deficiencies, their buyers must have a strong taste for them. Relatedly, consumer ratings should not be used to infer product design: what is polarizing ex-ante need not be so among its buyers. I test these predictions using Goodreads book ratings data, and find strong evidence for them. Goodreads appears to serve mostly a matching purpose: tracking the behaviour of its users over time reveals an increasing degree of specialization as they gather experience on the platform. They rate books with a lower average and number of ratings, while focusing on fewer genres. Thus, they become less similar to their average peer. Taken together, the findings suggest that consumer ratings contribute to both the long tail and, relatedly, consumption segregation. For managers, this illustrates, counterintuitively, the reputational benefits of polarizing products, particularly early in a firm's lifecycle, but only when paired with the ability to match with the right consumers.

Presentation 3 **Incentivized Reviews**
Sungsik Park[1], Woochoel Shin[2], Jinhong Xie[2], [1]University of South Carolina, Cayce, SC, [2]University of Florida, Gainesville, FL
Abstract: Firms often provide financial incentives to motivate consumers to post reviews on their products. Despite the popularity of so-called *incentivized reviews*, little is known about the consequences of this practice. In this paper, we present empirical studies documenting the impact of incentivized reviews on product sales and consumer welfare. Specifically, we analyze the impacts of an Amazon policy change from allowing to banning incentivized reviews. Our analysis shows that incentivized reviews lift product sales through inflated ratings and higher perceived helpfulness of contents (compared with organic reviews). However, they also decrease consumers' post-purchase evaluations, suggesting that incentivized reviews may hurt consumers by misleading them into suboptimal choices. These results also suggest that while incentivized reviews increase sales, they may lead to a long-term disadvantage for the firm. Moreover, review platforms and regulators may need to prepare more effective consumer education regarding incentivized reviews. Finally, we empirically compare two types of incentivized review mechanisms, firm-initiated and platform-initiated, which differ in who (the firm or the platform) commissions the reviewers. Our results show that switching from a firm-initiated to a platform-initiated mechanism eliminates rating inflation while preserving perceived helpfulness. These findings provide empirical evidence to support the advantage of a platform-initiated IR mechanism.

Presentation 4 **Quality Competition in the Fast Food Chain Industry: Evidence from Online Reviews**
Sungtak Hong[1], Prasad Vana[2], Dirk Hovy[1], [1]Bocconi University, Milan, Italy; [2]Dartmouth College, Hanover, NH, Contact: sungtak.hong@unibocconi.it
Abstract: This research uses online restaurant reviews from Yelp to explore how restaurants compete in a domain of product and service quality. By focusing on the fast food restaurants, which offer a similar menu of products (e.g., hamburgers) with varying product quality, we document how fast food restaurants adjust their service quality in the presence of higher product quality competitors (e.g., In-N-Out Burger) in the local market. In the presence of distinct tiers of (perceived) food quality in the market, an increase in the number of high-quality restaurants could lead competing restaurants to improve their product offerings. For store managers of a fast food chain, however, such an action of improvement may be limited as their menu and the selection of food ingredients are largely determined and fixed at the chain level. In this context, an interesting question is whether and how each local restaurant competes against high-quality restaurants whose food quality is perceived higher by customers. In particular, we explore if they react to competitors with higher *food* quality by providing customers with better *service* quality. For our empirical analysis, we use online consumer review data from Yelp. We first document that restaurants exhibit higher star-ratings in the presence of high-quality competitors in their local markets, applying ATE estimation via machine learning augmented algorithms. Further, we analyse review text data. Word embeddings and clustering words to groups of similar semantic meaning reveal some significant difference in review contents depending on the presence of high-quality competitors. For restaurants competing with high-quality competitors, customers left more comments on positive service (e.g., 'great customer service' and 'friendly staff') and fewer comments on negative service (e.g., 'rude', 'unprofessional').

Presentation **Session Chair**
Nah Youn Lee, Duke University, Fuqua School of Business, Durham, NC

Session FC07 **Marketing for Good: The Impact of Marketing Interventions in Emerging Markets**
07
11:30 AM - 12:30 PM

Presentation 1 **Modernization of Small Retailers and Brand Equity: An Investigation using Photographic Data**
Shreya Kankanhalli[1], Stephen J. Anderson[1], Leonardo Iacovone[2], Sridhar Narayanan[1], [1]Stanford University, Stanford, CA, [2]World Bank Trade and Competitiveness Global Practice, Washington, DC
Abstract: In this paper, we study the relationship between modernization of small retailers in Mexico City and the brand equity of these businesses amongst their customers. Modernizing businesses, in ways that are visible to consumers, can have two different effects on consumer perceptions, with opposite consequences on business performance. On the one hand, this type of customer-facing modernization may enhance the retailer's brand equity, with positive effects on business performance metrics such as sales and profits. On the other hand, a modernized business may be perceived by consumers as more expensive, and this may negatively impact sales and profits. We investigate the impact of customer-facing modernization on business performance, through its effects on brand equity and price perceptions. A key step in investigation is to develop measures of brand equity for these firms, as there are no readily available datasets containing these measures at the firm-level for small firms in emerging markets. We therefore use a novel approach of analyzing information on brand equity contained in photographs of businesses to study these questions, complementing them with insights obtained from data on brand equity perceptions collected directly from consumers. All of this is done in the context of a randomized controlled trial on the impact of customer-facing modernization versus internally facing modernization for 1154 retailers in Mexico City, allowing us to draw causal conclusions from our study. Measuring customer perceptions of brand equity is challenging, especially in the context of developing countries, due to the significant cost and effort required to collect data from consumers of small businesses. Nevertheless, in our study, we obtained consumer-level data on brand and price-related perceptions of the businesses in our sample, through an intensive field effort. In addition, we also obtained photographic data on the businesses themselves. These photographs, showing the exteriors and interiors of the businesses contain information similar to those used by consumers to form brand and price perceptions. We use a novel AI-based approach to analyze these photographs. Specifically, we first obtain images from businesses in both the treatment and control groups. This collection of photographs was done during the regular post-intervention field data collection exercise that is typical to RCTs. This minimized the cost of collection of these photographs and was simple to implement since the photographs were taken using mobile phones that were also used to administer the regular surveys of businesses. Next, we take a random sample of these images and ask human subjects to rate these images on various aspects of brand equity, as well as price perceptions. This gives us a high-quality dataset of images of businesses, and their corresponding measures of brand equity and price perceptions. Third, we train an image processing AI algorithm using this training dataset. Finally, we use the trained algorithm to convert the full set of photographic images into a dataset containing the corresponding brand equity and price perception measures. Our analysis of the effect of modernization on brand equity and price perceptions is conducted using this dataset. Our preliminary analysis of the customer-level brand perception data shows that firms randomly assigned to receive a customer-facing modernization intervention were rated statistically significantly higher on brand equity dimensions by their customers relative to control group firms, and the effect size was a 1.67% higher score on an index of brand equity measures. Moreover, photographic images of businesses in the customer-facing modernization treatment group were rated significantly higher by human subjects (who were located in US and blind to treatment status) on all brand equity dimensions from Keller (1993) and Aaker (1997) relative to images from the control group, except for the dimension of brand 'ruggedness', on which they were rated significantly lower. We aim to see if this pattern of results persists when the full set of photographic images are converted to brand equity ratings via the prediction algorithm. Our measurement approach has implications beyond this specific project. A number of studies in the developing country context suffer from poor quality of data, and high costs of data collections. We believe that our approach of collecting image data relatively inexpensively and using an AI algorithm to convert those images into a usable dataset for analysis has application in a variety of contexts where business activities or performance can be visually assessed, for answering a variety of questions.

Presentation 2 **Leveraging Marketing Tools and Alternative Sources of Information for New Product Adoption: Alleviating the Toxic Pesticide Problem**
Pradeep Chintagunta[1], Wanqing Zhang[2], Manohar U. Kalwani[2], [1]University of Chicago, Chicago, IL, [2]Purdue University, West Lafayette, IN
Abstract: This paper asks the question: can marketing tools that are typically used to enhance business performance contribute, at the same time, to creating a better world? The use of toxic pesticides in the agrarian economy has been viewed as a global problem. In this paper, we examine the use of marketing tools to facilitate the adoption of an environmentally friendly new technology by farmers - a non-toxic pesticide - to combat this problem. We compare the effectiveness of alternative sources of information in resolving a farmer's uncertainty regarding the technology, improving learning outcomes, and promoting the diffusion process. In particular, we investigate whether (i) mobile technology-based social media can facilitate the adoption process via the exchange of information between prospective customers, and (ii) the role of an opinion leader in this context. Further, we compare the outcomes in (i) and (ii) with (iii) a more traditional, firm initiated, customized marketing service and support approach. Empirically, we conduct a field experiment on the adoption of this technology by farmers in 34 villages in rural China. Our findings reveal that the social interaction platform with an opinion leader is the most effective in promoting trial behavior in the (initial) stage of the diffusion process when customers face the most technological uncertainty. The firm initiated approach is similarly effective in achieving a high overall trial and final adoption rate, but is more expensive to implement. Without an opinion leader, the social media platform is less effective in terms of generating trial due in part to the difference in nature of the discussions on the platform with and without the opinion leader. We then discuss the broader implications of our findings.

Presentation 3 **Win-Win in Villages: How Inventory Advances to Direct Salespeople Can Benefit Firms, Customers, and Employees**
Iris Steenkamp[1], Heather Kappes[2], GAURAV MEHTA[3], Rajesh Chandy[4], Om Narasimhan[5], [1]Miss, London, United Kingdom; [2]London School of Economics and, London, United Kingdom; [3]INFOSYS LIMITED, PUNE MAHARASHTRA, India; [4]London Business School, London, United Kingdom; [5]University of Minnesota, Minneapolis, MN

Abstract: Firms face ever more urgent calls to look beyond their own profits as they conduct business, and to examine the impact of their business practices on the communities they serve and the people they employ. This research examines one way to do so: by targeting rural consumers in emerging markets with socially beneficial products, and by employing socially disadvantaged salespeople to sell these products. Marketing these products in rural parts of emerging markets is challenging because consumers are often unfamiliar with the products, have entrenched habits, and are unlikely to purchase without in-person observation of the products. Moreover, rural salespeople are often inexperienced and lack resources to acquire inventory for demonstrations. In this research, we study the impact of advancing inventory on credit to female salespeople who engage in door-to-door sales of products such as smokeless cookstoves, clean solar lamps, and sanitary napkins in rural India. Results of two randomized controlled trials indicate that advancing inventory had a strong effect, increasing sales of these socially beneficial products—and hence income of saleswomen—by over 400% in the treatment groups relative to the control groups. These effects were due at least in part to higher rates of activity among saleswomen who received inventory advances on credit. We then use videos of saleswomen to test the hypothesis that those saleswomen who receive inventory on credit experience bigger gains in confidence. Such evidence points to ways in which better marketing can yield beneficial outcomes for firms as well as for their employees and the communities they serve.

Presentation **Session Chair**

Rajesh Chandy, London Business School, London, United Kingdom.

Session FC08 **Platforms II**
08
11:30 AM - 12:30 PM

Presentation 1 **Can Targeted Incentive Benefit Non-Targeted Sellers? An Empirical Analysis**
Xiang Hui[1], **Meng Liu**[1], Tat Y. Chan[2], [1]Washington University in St. Louis, St. Louis, MO, [2]Washington University, St. Louis, MO
Abstract: Platforms often use targeted incentive to nudge desirable behaviors from service providers, but little is known about its effect on the *non-targeted sellers.*To study this question, we exploit a policy change that financially rewards certified elite sellers for providing fast handling and money-back returns (Premium Service) on a large e-commerce platform. We find that the *non-targeted sellers* became more likely to offer Premium Service, and experienced a larger increase (resp. decrease) in sales when offering (resp. not offering) Premium Service in markets with larger presence of certified sellers. The results are driven by two mechanisms. First, non-targeted sellers experienced intensified competition, which reduced their sales. Second, non-targeted sellers learned from the behavioral change of targeted sellers and offered Premium Service, which is a profitable strategy that they were unaware of, leading to higher demand. We discuss the implications of these results for platforms; notably, targeted incentive could provide informational benefit to the non-targeted group, besides the competition effect.

Presentation 2 **Regulating Professional Players In Peer-to-peer Markets: Evidence From Airbnb**
Wei Chen[1], **Zaiyan Wei**[2], Karen Xie[3], [1]University of Arizona, Tucson, AZ, [2]Purdue University, West Lafayette, IN, [3]University of Denver, Denver, CO, Contact: zaiyan@purdue.edu
Abstract: We study professional players and their impacts in peer-to-peer (P2P) markets. P2P markets predominantly consisted of individual, nonprofessional agents but have recently witnessed a rapid influx of corporate suppliers and other professional agents who capitalize on these platforms. What is the role of professional players in a P2P market? Should platforms regulate professional players? We seek answers to these questions by leveraging a quasi-experimental opportunity on Airbnb that implemented a restriction on the number of properties a host can manage in several U.S. cities. Our empirical findings are mainly threefold. First, we find that the properties of professional hosts, who were subject to the policy restriction, were of higher quality and more expensive than those of their nonprofessional counterparts and, likely because of that, secured higher revenue. Second, by restricting the participation of professional hosts, the policy, surprisingly, increased the total supply on the platform. In addition, although we find that the policy decreased property booking prices, the total reservations at the market level were not significantly affected. Further evidence indicates that these policy effects can be attributed to the change in the composition of hosts after the policy (i.e., more nonprofessional hosts stayed in the market), which cannibalizes the demand of customers who prefer professional services. Lastly, we find the policy reduced platform revenue. Our findings provide timely implications for platform governance, vertical differentiation, and supplier management in P2P markets.

Presentation 3 **A Dynamic Model Of Owner Acceptance In Peer-to-peer Sharing Markets**
Chuang Tang[1], Dai Yao[2], Junhong Chu[2], [1]Peking University HSBC Business School, Shenzhen, China; [2]National University of Singapore, Singapore, Singapore.
Abstract: Online peer-to-peer (P2P) sharing marketplaces enable owners of resources to share their idle resources to peer customers. A natural question facing an owner, when a renter asks for the resource, is whether to accept this request. Accepting the request helps the owner to fill up the idle periods of the resource and generate a payoff, but it hampers the owner's flexibility to serve a future request for a longer duration. This paper develops a dynamic structural framework of the acceptance decisions by owners in the context of P2P sharing, and apply it to a unique dataset from a leading P2P car sharing platform in China. The model accommodates the key feature that availability state of the resource influences its incoming requests. Results suggest that owners embrace P2P sharing for different purposes: A large part leverage the platform to build social connections, and the rest are primarily profit seeking. We conduct counterfactual experiments and find that the platform canimprove its revenue by using minimum rental duration or by incentivizing longer rentals. We also find that reduction in resource availability urges an owner to accept more, which however remarkably shrinks the revenue of him and the platform.

Presentation 4 **Sequential Social Media Advertising: An Empirical Evidence**
Rajiv Garg, Parshuram Hotkar, **Kristen Sussman**, UT Austin, Austin, TX
Abstract: Social media platforms like Facebook, Instagram and Twitter offer advertisers various strategies for targeting consumers. Usually, the targeting is based on the advertisers' perceived aggregate customer base. In this paper, we present a sequential social media advertising strategy that could be used by both advertisers and platforms to target micro-communities for enhancing the returns from social media advertisements. We present a theoretical model for information retention and spillover in social media marketing, which highlights the benefit for advertisers to first target a small group, that is based on a set of specific interests and then target a broader group of potential consumers based on extended interests. The model is empirically tested through two online randomized field experiments that sequence social ads for a biopharmaceutical company and a consumer goods retailer. In both experiments, we find that advertising first to a small micro-community followed by a large macro-community performs better on all three platforms (Facebook, Instagram and Twitter). The findings suggest two benefits to sequenced targeting on social media. First, information is better mobilized through social media by targeting a larger community. Second, by reaching a smaller community first, advertisers can improve overall sales by creating buzz and spillover to a larger community.

Presentation **Session Chair**
Kristen Sussman, UT Austin, Austin, TX

Session FC09 **Gary Lilien ISMS-EMAC-MSI 2020 Practice Prize Finalists**
09
11:30 AM - 12:30 PM

Presentation 1 - **Machines and Humans: Field Experiments on Generating Business Value from Artificial Intelligence Chatbot in a Financial Services Company**
Xueming Luo[1], Siliang Tong[1], Zheng Fang[2], Zhe Qu[3], [1]Temple University, Philadelphia, PA, [2]Sichuan University, Sichuan, China; [3]Fudan University, Shanghai, China.

Presentation 2 - **CBCV: Reshaping the Practice of Corporate Valuation Using a Customer- Driven Approach**
Daniel McCarthy, Goizueta Business School, Emory University, Atlanta, GA

Presentation 3 - **The Comprehensive Effects of Sales Force Management: A Dynamic Structural Analysis of Selection, Compensation, and Training**
Doug J. Chung[1], Byungyeon Kim[1], Byoung G. Park[2], [1]Harvard Business School, Boston, MA, [2]University at Albany, Albany, NY

Presentation **Session Chair**
Koen Pauwels, Ozyegin University, Newton, MA

Session FC10 **Bayesian Dynamics and Time Series**
10
11:30 AM - 12:30 PM

Presentation 1 **When To Buy, When To Attend - Modeling Event Ticket Purchase Dynamics**
Gwen Ahn, Eric Schwartz, Fred M. Feinberg, University of Michigan, Ann Arbor, MI, Contact: geunhae@umich.edu
Abstract: Performing arts organizations offer two types of tickets: singles and bundled subscription packages. The latter are typically curated based on genres and performance types, with limited consideration over when individual patrons prefer to purchase or attend. Consequently, we model ticket purchase behavior for performances with the goal of designing customized subscription packages based on observed consumer choices. When purchasing tickets, consumers make two decisions: which performance to attend (considering both the schedule and characteristics), and when to make the purchase. And customer preferences vary for both decisions. For example, user A prefers female vocalist performances and buys tickets as soon as tickets go on sale. By contrast, user B prefers modern European dance performances but tends to wait until shortly before each performance to buy. This highlights the importance of capturing correlated and heterogeneous latent temporal preference dynamics over both when to attend a performance and when to make purchases, over and above detailed performance and demographic characteristics. Characterizing these preferences, we develop a Bayesian nonparametric framework via Gaussian Process Priors to capture preference dynamics, coupled with text mining techniques to assess latent performance characteristic dimensions, using a comprehensive dataset on individual-level transactions and performance descriptions from brochures. The results inform the development of a mix of ticket package bundles reflecting heterogeneous preferences in performance and timing. The developed modeling framework can be applied to other contexts in which users have latent temporal preferences over purchase and consumption timing, such as vacation packages, sporting events, and meal purchase programs.

Presentation 2 **Investigating Household Brand Loyalty And Variety Seeking As Independent Variables Across Product Categories.**
Roozbeh Irani-Kermani[1], Ardalan Mirshani[2], [1]Sam Houston State University, Huntsville, TX, [2]Pennsylvania State University, State College, PA, Contact: Roozbeh@shsu.edu
Abstract: Variety-seeking is commonly described as consumers' desire to search for the ideal bliss point through diversification and researchers commonly measure and model that by observing the product-switching patterns from one purchase occasion to another at the brand level. Brand loyalty is defined as a state-dependent persistence of preference for a particular brand despite potential price changes. These definitions make variety-seeking the negation of brand loyalty. Using a more general definition for variety-seeking based on product attribute space, we define variety seeking and brand loyalty as separate concepts so that a customer can be both, either, or neither. Although previous research has investigated empirically the effects of brand loyalty across product categories, not much is known about household behavior when it comes to variety-seeking as an independent factor. Using mix multinomial logit model we investigate consumers' choice behavior across four product categories as a function of households' intrinsic brand preferences, marketing variables, along with brand loyalty and variety seeking as two separate variables. To accommodate heterogeneity across households, a Bayesian variance component approach is used. We use the Nielsen Homescan dataset for the retail markets during the years 2009-2014. The results point out that over four product categories households display similar behavior when it comes to brand loyalty and different behavior toward variety seeking. Additionally, there is not a significant correlation between variety seeking and brand loyalty measured based on a sequence of repeated consumer purchases while a significant correlation exists between both concepts (variety seeking and brand loyalty) and marketing mix sensitivities.

Presentation 3 **Selecting Data Granularity And Model Specification Using Doubly Robust Inference**
Mingyung Kim, Eric T. Bradlow, Raghuram Iyengar, University of Pennsylvania, Philadelphia, PA, Contact: mingyung@wharton.upenn.edu
Abstract: Firms routinely employ temporal sales data for making managerial decisions such as determining optimal prices. To use such data appropriately, managers need to make two decisions: namely, (a) the temporal granularity for analysis (e.g., weekly, monthly, quarterly) and (b) an accompanying demand model. In most (if not all) empirical contexts, however, the "appropriate" granularity-model combination is unknown, leaving managers vulnerable to their uncertain granularity and model choices. Thus, it would be ideal to make marketing decisions (e.g., pricing) that are robust to the time granularity selected and the employed demand model. While extant literature has proposed methods that either select the best-fitted model (e.g., BIC) or conduct robust inference against model misspecification (e.g., weighted likelihood), most methods assume that the granularity is correctly specified (or pre-specify it). Our research fills this gap by proposing a method that not only identifies the best-fitted granularity-model combination but also conducts robust inference for both granularity and model misspecifications (i.e., doubly robust inference). An extensive set of simulations shows that our method has high statistical power vis-a-vis a multitude of extant approaches for selecting the best-fitted granularity-model combination. To demonstrate the double robustness, we demonstrate that our method also reduces bias in estimates under incorrect granularity and/or model selection. We apply our framework for estimating the price and advertising elasticities for a real data set on orange juice sales, and find that the optimal price and profit differ as compared to extant approaches.

Presentation 4 **Early Detection Of User Exits From Clickstream Data: A Markov Modulated Marked Point Process Model**
Tobias Hatt, **Stefan Feuerriegel**, ETH Zurich, Zurich, Switzerland. Contact: sfeuerriegel@ethz.ch
Abstract: Most users leave e-commerce websites with no purchase. Hence, it is important for website owners to detect users at risk of exiting and intervene early (e.g., adapting website content or offering price promotions). Prior approaches make widespread use of clickstream data; however, state-of-the-art algorithms only model the sequence of web pages visited and not the time spent on them.
In this paper, we develop a novel Markov modulated marked point process (M3PP) model for detecting users at risk of exiting with no purchase from clickstream data. It accommodates clickstream data in a holistic manner: our proposed M3PP models both the sequence of pages visited and the temporal dynamics between them, i.e., the time spent on pages. This is achieved by a continuous-time marked point process. Different from previous Markovian clickstream models, our M3PP is the first model in which the continuous nature of time is considered. The marked point process is modulated by a continuous-time Markov process in order to account for different latent shopping phases. As a secondary contribution, we suggest a risk assessment framework. Rather than predicting future page visits, we compute a user's

risk of exiting with no purchase. For this purpose, we build upon sequential hypothesis testing in order to suggest a risk score for users exits. Our computational experiments draw upon real-world clickstream data provided by a large online retailer. Based on this, we find that state-of-the-art algorithms are consistently outperformed by our M3PP model in terms of both AUROC (+6.24 percentage points) and so-called time of early warning (+12.93%). Accordingly, our M3PP model allows for timely detections of user exits and thus provides sufficient time for e-commerce website owners to trigger dynamic online interventions.

Presentation **Session Chair**
Stefan Feuerriegel, ETH Zÿrich, Zÿrich, Switzerland.

Session FC11 **Research in Crowdfunding and Success**
11
11:30 AM - 12:30 PM

Presentation 1 **Empowering Education with Crowdfunding: Empirical Evidence from California Public Schools**
Chen Zhou[1], MANPREET GILL[2], Qiang Liu[3], [1]University of South Carolina, Columbia, SC, [2]COLUMBIA, SC, [3]Purdue University, West Lafayette, IN
Abstract: In the past decade, educational crowdfunding has provided public school teachers the opportunity to acquire classroom resources. The crowdfunded resources are unique compared to resources drawn from conventional sources, as (1) the crowd evaluates and screens the crowdfunding proposals, and (2) the teacher-initiated resources empower teachers to cater to heterogeneous student needs. In this research, the authors investigate the role of crowdfunding in public K-12 education as an emerging source for resource investment. Collating novel data from an education crowdfunding platform dedicated to public schools in the U.S and the California Department of Education at the school-subject-grade-academic year level, they find that crowdfunded resources can effectively improve student academic achievement. They also provide empirical evidence for the conceptualization on how education crowdfunding improves student performance. Furthermore, this research identifies boundary conditions for this effect, in terms of the subject-matter for which the resources are used (i.e., English), the attributes of resources acquired (i.e., books and technology), and student readiness (i.e., student proficiency levels). This research provides implications for education administrators, crowdfunding platform managers, donors/investors in public education, and public school teachers.

Presentation 2 **Early Bird Matters: Early Backers' Social and Geographic Influences on the Success of Online Crowdfunding**
Zecong Ma[1], Qi Wang[2], [1]St. Mary's University, San Antonio, TX, [2]China Europe International Business School, Shanghai, China.
Abstract: While online crowdfunding provides a novel method for entrepreneurs and start-ups to raise funding from consumers, a high percentage of crowdfunding projects fail to achieve their funding goals. This study investigates the impact of early backers on the success of crowdfunding (i.e., reaching funding goals) by taking into account their social and geographic influences simultaneously. Based on a dataset including 191 projects and 18,715 crowdfunders collected from Kickstarter, we found that early backers significantly influenced the success of crowdfunding and such influences could be either positive or negative. The direction of such influences depended on the uncertainty of project completion. Specifically, for projects with low uncertainty of completion, early backers positively influenced the success of crowdfunding when they were socially close to many followers (i.e., when they have funded common projects with many followers in the past), but negatively influenced it when they were geographically close (i.e., when they are located closely with many followers). In contrast, for projects with high uncertainty of completion, early backers' social and geographic influences turned opposite. These opposite influences of early backers imply both herding and deviant behaviors in crowdfunders' decisions and provide managerial implications for crowdfunding creators to effectively target the right crowd. Keywords: Crowdfunding, social network, social influence, geographic influence.

Presentation 3 **Intensive versus Extensive Margin: Courting Investors in Online Crowdlending Market**
Jian Ni, **Shiqi Wang**, Johns Hopkins University, Baltimore, MD
Abstract: Online peer-to-peer lending platforms attempt to provide services with lower transaction costs than traditional financial institutions, where lenders can earn higher returns while borrowers can borrow money at lower interest rates than they would receive from banks. However, loans issued on such platforms tend to suffer from severe asymmetric information, where lenders would have to make their own investment decisions based on project descriptions created by the borrowers, which often contain exaggerated or false advertising information. Adverse loan performance may induce lenders to exit the market while lenders could update their beliefs on repayment rate based on their past investment outcomes and therefore improve future success rate. In such two-sided market, decisions on lenders' side would in turn affect participation on borrowers' side. We study to what extend this asymmetric information between lender and borrower affect the expansion of the two-sided market, in terms of two margins of choice separately: the decision to enter the market for the first time (the extensive margin) and the choices to participate again (the intensive margin). We find evidence of asymmetric information and lenders making their investment decisions based on past investment outcomes. Policies to eliminate asymmetric information and reward repeated participation may help retain existing users and in turn attract new users.

Presentation 4 **Donors, Buyers and Information Disclosure in Crowdfunding Markets**
Lu Yan[1], Ting Zhu[1], Qiang Liu[2], [1]Purdue University, WEST LAFAYETTE, IN, [2]Purdue University, West Lafayette, IN, Contact: yan245@purdue.edu
Abstract: Crowdfunding is a fast-growing method for entrepreneurs to finance their projects. However, crowdfunding platforms are risky because of a high level of information asymmetry existing between the entrepreneurs and the potential backers, which results in low success rates for the crowdfunding projects. In this paper, we study the impact of the size and the composition of the backer's pool (donors vs. buyers) on the outcomes of the crowdfunding projects by using an event study of Indiegogo's launch of Generosity.com. We find that after the launch of Generosity, a donation-based based crowd funding platform, fewer donors were active in the original Indiegogo platform. Surprisingly, we find higher success rates and more funds collected for the campaigns at Indiegogo. Such changes are driven by fewer project launched on the original Indiegogo platform after the platform change, higher quality projects entering the market, and more importantly, more costly information disclosure (such as video and images) were provided by the entrepreneurs. Our results are consistent with the notion that the entrepreneur's information disclosure strategy is driven by potential backers' motivations to support the campaign.

Presentation **Session Chair**
Ting Zhu, Purdue University, WEST LAFAYETTE, IN

Friday, June 12, 2020
Session "FD"
12:45 PM - 1:45 PM

FD01. Machine Learning, Artificial Intelligence, and Causal Inference in Marketing V

FD02. User Engagement in Different Digital Platforms

FD03. Game Theory: Applications I

FD04. Location-Smart Retailing: Unlock the Power of 24/7 Consumer Movement Data

FD05. Investor Advertising

FD06. New Insights on Advertising and Reviews

FD07. Marketing & Politics

FD08. Platforms III

FD09. Applied Choice Experiments

FD10. Bayesian Methods and Applications

FD11. Healthcare Marketing

Session FD01 **Machine Learning, Artificial Intelligence, and Causal Inference in Marketing V**
01
12:45 PM - 1:45 PM

Presentation 1 **Let Artificial Intelligence Be Your Shelf Watchdog: The Impact of AI-powered Shelf Monitoring on Product Sales**
Yipu Deng[1], Jinyang Zheng[1], Liqiang Huang[2], Karthik Kannan[1], [1]Purdue University, West Lafayette, IN, [2]Zhejiang University, Zhejiang, China.
Abstract: Artificial intelligence (AI) has been shown to generate economic values in a growing number of domains. We collaborate with Danone, a leading fast-moving consumer goods (FMCGs) manufacturer, to study how the use of AI-based shelf monitoring helps with manufacturers' retailer management efforts. For this study, we used data from various strategies: a quasi-experiment and also a field experiment. We find evidence that AI-powered shelf monitoring significantly improves product sales in general. This effect is only partially persistent in that it diminishes after monitoring is terminated. Our mechanism analysis further reveals that the effect is particularly salient for independent retailers but not for chained retailers. The major difference of shelf monitoring between these two types of retailers is a higher degree of heterogeneity of shelf space rental contracts among independent retailers. Therefore, the finding indicates that AI-powered shelf monitoring is better than human monitoring and, thus, generates incremental values for heterogeneous shelf displays. We further interview with the delegates that use AI-powered shelf monitoring and find a low marginal cost of adopting. Along with the previous finding of partial persistence, we find that the monitoring can be continuously done using AI to generate value for the manufacturer even in the long term. Our research contributes to the literature stream of retailer management with information technology (IT), monitoring, and shelf management as well as generates managerial insights for practitioners who consider scientific retailing with AI.

Presentation 2 *****Late Cancellation***Customized Styling by Machine**
Zijun Shi[1], Lucy Xia[1], Alan Montgomery[2], [1]Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong; [2]Carnegie Mellon University, Pittsburgh, PA
Abstract: Styling is critical to facilitate consumer decision and boost sales in many product categories concerning aesthetics. In the fashion industry in particular, trends evolve at a shorter and shorter cycle, and consumers face the challenge of fashion styling: learning the ever-changing trends and maintaining trendy wardrobes. Traditionally, styling is undertaken by consumers themselves, salespersons in retail stores, or professional stylists or designers, which can be costly for consumers and subject to misalignment in tastes. We aim to propose a novel machine-learning based method to automate fashion styling in a customized, contemporary, and never-ending manner. Our method makes styling recommendations to individual consumers using a constrained semi-supervised learning system that exploits large scale user-generated data from the internet and fashion product data from major E-commerce platforms. Moreover, with experimental data collected from targeted consumers, we evaluate how our proposed "machine stylist" can provide more appealing styling options compared to baseline models and traditional approach. In addition to providing trendy and customized styling options to consumers, our proposed method also provides a tool for managerial usage. For example, retailers can make better decisions on product recommendations, product inventory and assortment based on their clientele.

Presentation 3 **Voicebot Versus Human for Sales Call Automation: Evidence from Speech Analytics**
Siliang Tong[1], Xueming Luo[1], Zheng Fang[1], Zhe Qu[2], [1]Temple University, Philadelphia, PA, [2]Fudan University, Shanghai, China.
Abstract: The rise of artificial intelligence (AI) empowers voicebots to conduct natural conversation, unveiling immense business potential to automate customer service in call centers. However, due to the lack of intuitive explanation from the black-box deep learning algorithms, academia has little understanding about how voicebots converse with customers during service interactions. To bridge this gap, we design and implement a field experiment with randomized assignment of 2,000 customers to receive a sales call from either a voicebot or a human agent for a personal loan renewal promotion. To understand the difference between voicebot and human agent's conversation pattern, we apply established voice analytic software and speech-to-text algorithms to extract agents' vocal features (i.e., pitch, amplitude, and speed) and speech content (i.e., selling adaptivity). Our results show that the AI powered voicebot can outperform human agents by 65.7% and 34.8% in terms of purchase rate and customer satisfaction, respectively for the designed task. Further exploration of agent's speech patterns suggests that voicebot has more stable vocal features (lower volatility in amplitude and speed) and applies more adaptive selling tactics in the conversation, which accounts for the superior performance. Additional agent optimal assignment simulation indicates that companies can achieve higher performance outcomes by assigning human and voicebot to serve heterogenous customer segments. These findings have useful implications regarding how managers can exploit sales automation and unstructured voice data to boost firm performance in the new AI era.

Presentation **Session Chair**
Xueming Luo, Temple University, Philadelphia, PA

Presentation **Session Chair**
Siliang Tong, Temple University, Philadelphia, PA

Session FD02 **User Engagement in Different Digital Platforms**
02
12:45 PM - 1:45 PM

Presentation 1 **Social Media Communication by Firm and Third Parties: Roles in Recall Remedy**
Anindita Chakravarty, Elham Yazdani, Kaushik Jayaram, University of Georgia, Athens, GA
Abstract: When a firm announces a product recall, its first responsibility is to communicate with affected customers and encourage them to seek the appropriate remedy. In the context of automobile recalls, we find that although social media is the most cost effective means of communicating with customers, few firms use social media to encourage customers to seek remedy. It is very important for recalling firms to remedy as many potential defects as possible as defective products on the market may be cause for future consumer harm and firm liability. Even third party information providers such as truecar.com or Kelly blue book use social media rather strategically to inform car owners about an automobile recall. In this study, we investigate the reasons behind an automobile manufacturer's strategic use of social media for the purpose of informing consumers about a recall. Further, we also study if use of social media for such communication aids in increasing the percentage of cars remedied and reduces the time to remedy. We use twitter data from automobile firms, third party information providers and customers for 1000 NHTSA recalls from 2009 to 2018. Using a VAR model that accounts for simultaneous activity across firms, third parties, customers and investors (stock prices), we find several firm and recall related factors that influence a recalling firm's use of social media as well the effectiveness of social media for recall remedy.

Presentation 2 **The Influence of User Emotion on Search Engine Queries and Advertisement Preferences**
Sarah Whitley, Anindita Chakravarty, **Lan Anh Nu Ton**, University of Georgia, Athens, GA
Abstract: We study the role of emotion states in influencing the choice of words in product search queries on search engines. Further, we investigate whether emotion states via the choice of words in search queries influences an individual's clicking behavior on the search query results page. Via a series of experiments that include open ended MTurk tasks as well as controlled experiments in the laboratory, we find that when individuals are in specific emotion states while searching for a product on a search engine, they actively regulate their emotion by using specific emotion laded descriptors in their product search queries. Thus, we infer that if product queries in search engines include emotion words, they could imply that the individual is in a specific emotion state. We investigate if such emotion states improve the chances of clicking on ads relative to organic search results on the results page. If emotion states really improve the chances of ad clicks, then advertisers should use emotion descriptors in product search queries in ad targeting. We also study if emotions expressed in the ad content should also align with the emotion state of the individual as expressed in the product search query. We are in the process of designing multiple experiments to study if emotion states influence ad clicks.

Presentation 3 **Identifying Emotions in Images and Their Effects on Donation Behavior in Online Crowdsourcing Platforms**
Elham Yazdani[1], Anindita Chakravarty[1], Jeff Inman[2], [1]University of Georgia, Athens, GA, [2]University of Pittsburgh, Pittsburgh, PA
Abstract: Rewards-based crowdfunding is one of the most popular and profitable form of platform strategies. Gofundme.com doesn't have any platform fee but both number of donations per project and amount of donation per project matters for their business model. Our research objective is to understand how facial emotions expressed in posted images might be strategically used to increase individual project effectiveness as measured by metrics relevant to the platform, i.e., number of donations and donation amount per project. We also investigate how the impact of facial emotions in images depends on textual descriptions of a project or some other project level attributes. We develop a theoretical framework predicting that the facial expressions of a person's emotions in an image will have high or low effects on the observer's (or potential donor's) perceived empathy and perceived justice for the person in the image. In this research, we focus on four emotions that can be elicited from facial expressions in images using artificial intelligence methods; happy, sad, anger and surprise. We focus only on these four emotions because the literature on facial expressions of emotion concludes that whereas artificial intelligence methods can reliably infer six basic emotions (happiness, sadness, anger, surprise, fear and disgust) from facial expressions, only four of these (happiness, sadness, anger and surprise) are accurately inferred irrespective of differences in cultural expressions of emotions (Jack et al. 2016).We aim to answer the following research questions:1) What is the impact of the four universally recognized emotions in facial expressions (happy, sad, anger and surprise) on number of donors and average donation amount per project?2) Are these effects moderated by the donation context (i.e., medical emergency, natural disaster, charity, education or memorial)?3) What are the psychological mechanisms that mediate the impact of the four emotions in facial expressions? We use empirical analysis to answer the first two research questions and MTurk surveys to answer the third question.

Presentation 4 **The Dynamic Role of Reviewer Ranking on Different Groups of Customers**
Shyam Gopinath[1], **Elham Yazdani**[2], [1]**Indiana University, Bloomington, IN**, [2]**University of Georgia, Athens, GA**
Abstract: Online opinion leaders have a role to play in disseminating information and driving product sales. In this research, a Dynamic Linear Modeling (DLM) framework is used to investigate the differential dynamic impact of top ranked reviewers and bottom ranked reviewers on product sales, across top 50-selling DMAs. Instrumental variables are used to address endogeneity of the key online WOM measures. The dataset consists of a panel data of all reviews and product sales information covering the first two months of release for all 141 new music albums released on Amazon.com over an approximately three-month period. There are several key findings. First, we find that bottom-ranked reviewers are more influential than top-ranked ones on product sales, which arises due to their differences in both writing style and product level knowledge. Second, we find that the impact of two reviewer groups vary across different consumer demographics. Third, our market level econometric model allows us to rank different markets base on the responsiveness of the demographic groups to both top and bottom ranked reviewers. Fourth, additional analysis indicates that bottom-ranked group has impacts both online and offline sales, whereas top-ranked reviewers only influence offline sales. Finally, looking at time-varying impacts of two reviewer groups shows that bottom-ranked reviewers have bigger impact than top-ranked group on sales during most time periods in the first 6 weeks, and top-ranked reviewers have bigger impact on sales than bottom-ranked group only when the product is either new or mature.

Presentation **Session Chair**
Anindita Chakravarty, University of Georgia, Athens, GA
Elham Yazdani, University of Georgia, Athens, GA

Session FD03 **Game Theory: Applications I**
03
12:45 PM - 1:45 PM

Presentation 1 **Education Inequality And Targeted Admissions In Developing Markets**
Weining Bao[1], Jian Ni[2], **Shubhranshu Singh**[2], [1]University of Connecticut, Storrs, CT, [2]Johns Hopkins University, Baltimore, MD, Contact: shubhranshu.singh@jhu.edu
Abstract: Students preparing for college admissions often make monetary investments (e.g., private coaching) to enhance the productivity of their study efforts. We consider a model in which students, who can afford to make monetary investments towards education, decide whether to make such investments. All students study for and take an admissions test. The college admits the top performing students. We show that education inequality arises from the inability of low-income students to make productivity enhancing monetary investments. Education inequality increases in the size of higher-income students and decreases in the admission capacity. In the context of developing markets, we study implications of a targeted admissions policy that aims to reduce the education inequality by transferring seats to students with characteristics that are correlated with inability to make monetary investments. We show such a transfer, if small, can be student welfare enhancing. However, a large transfer can reduce student welfare.

Presentation 2 **SIGNALING QUALITY VIA DEMAND LOCKOUT**
Andreas Kraft, Raghunath S. Rao, University of Texas-Austin, Austin, TX, Contact: andreas.kraft@mccombs.utexas.edu
Abstract: In many consumption contexts, consumers face uncertainty about the quality of products and services. Firms often try to resolve quality uncertainty via price signaling, where a higher price implies higher quality. However, in the modern economy, consumption increasingly involves a fixed marginal cost (e.g., streaming platforms), and hence price as the signal becomes unavailable. In this paper, we propose and empirically test a novel mode of quality signal: firms' active exclusion of a profitable segment of consumers- a phenomenon we refer to as "demand lockout." Using a simple theoretical model, we demonstrate that the opportunity cost of locking out a profitable segment can serve as a credible signal of quality as long as the non-excluded segment is large enough and a significant number of consumers are willing to wait for word-of-mouth to reduce the quality uncertainty. The value of the lockout signal increases as advertising becomes more expensive and decreases in more accurate third-party information. We empirically test the theory in the context of the motion picture industry, hypothesizing that firms might use R-ratings to credibly signal quality via exclusion of a large segment from consuming its product. Using a large corpus of text data from thousands of movie subtitles and using machine learning methods, we non-parametrically control for "age-inappropriate" content. We find empirical evidence consistent with our proposed theory. Movies are more likely to actively attempt at getting an R-rating when the value of the signal is larger. Furthermore, the box office revenue numbers are consistent with our key hypothesis that R-ratings serve as a credible signal and the value of this signal depends upon the availability and noisiness of the available external information like the critic reviews.

Presentation 3 **Product Introduction, Competition and Inter-firm Linkages**
Axel G. Stock[1], Mengyue Fan[2], [1]University of Central Florida, Orlando, FL, [2]University of Nevada, Reno, NV
Abstract: In today's marketplace some companies hold a significant share of a competitor's stock. In such a cross holding scenario, the stock holder's strategies and profit are impacted by the competitor's standing in the marketplace, and he has to take these interdependencies into consideration when making marketing mix decisions. We use a game-theoretic model to study the implications of a product introduction decision in this context. The stockholder and its competitor serve a market of consumers who have heterogeneous preferences with respect to an essential product attribute. Initially the competitor is better positioned on this attribute and therefore, the stockholder considers introducing a new product to improve his market position. However, while this has a positive direct effect on his profit it also increases competition between companies, a negative strategic effect. We identify optimal strategies and profits as a function of the differentiation between companies and the share that the stock holder owns of his competitor. While, as expected, we find that a new product introduction by the stock holder can hurt the competitor's profit, we also identify conditions under which counterintuitively both companies benefit from it.

Presentation **Session Chair**
Axel G. Stock, University of Central Florida, Orlando, FL

Session FD04 **Location-Smart Retailing: Unlock the Power of 24/7 Consumer Movement Data**
04
12:45 PM - 1:45 PM

Presentation 2 **Perils Of Location Tracking? Personalized And Interpretable Privacy Preservation In Consumer Mobile Trajectories**
Meghanath M Y[1], **Beibei Li**[1], Natasha Zhang Foutz[2], Anindya Ghose[3], [1]Carnegie Mellon University, Pittsburgh, PA, [2]University of Virginia, Charlottesville, VA, [3]New York University, New York, NY
Abstract: Consumer location tracking is becoming omnipresent on mobile devices, producing a vast volume of behavior-rich location trajectory data. These data have enabled a wide range of opportunities for monetization, such as location-based targeting. An advertiser, however, could go overboard with marketing campaigns and misuses the location data by invading consumer privacy and becoming a real-life "stalker." This calls attention for regulatory bodies and any location data collector to balance consumer privacy risk and advertiser utility, when sharing consumer location data with any advertiser. Existing approaches to privacy preservation are unsuited for location data as they are largely not personalized and difficult for a data collector to interpret the trade-off between the data's privacy risk to consumers and utility to an advertiser. To address this research gap, we propose a personalized and interpretable framework that enables a location data collector to optimize the risk-utility trade-off. Validating the framework on nearly one million location trajectories from more than 40,000 individuals, we find that high privacy risks indeed prevail in the absence of data obfuscation. For instance, an individual's home address can be accurately predicted within an average radius of 2.5 miles and mobile operating system with an 82% success. Moreover, 49% individuals' entire location trajectories can be fully identified by knowing merely two randomly sampled locations visited by the individual. Outperforming multiple baselines, the proposed framework significantly reduces each consumer's privacy risk (e.g., by 15% of inferring home address) with minimal (i.e., <1%) decrease in an advertiser's utility. As novel and powerful consumer location data become increasingly available, we demonstrate their utility to an advertiser and accompanying privacy risk to consumers, and most importantly, propose a personalized and interpretable framework to mitigate their risk while maximizing their utility.

Presentation 1 **Location-Smart Retailing: Unlock the Power of 247 Consumer Movement Data**
Natasha Zhang Foutz[1], **Baohong Sun**[2], Meghanath Macha[3], [1]University of Virginia, Charlottesville, VA, [2]Cheung Kong Graduate School of Business, New York, NY, [3]Carnegie Mellon University, Pittsburgh, PA
Abstract: Satellite, mobile, wireless, video and IoT technologies track people or objects' movement, generating a temporal sequence of spatial locations visited by individual consumers. These unique consumer movement data is not only location-aware, temporally and sequentially recorded and choice embedded, but also provides a continuous and holistic view of how each consumer interacts with all types of vendors 24/7 both locally and globally. This provides new opportunities for 1) retailers to understand the source and duration of store traffic under the influence of urban infrastructure and the daily, weekly and seasonal variations; 2) chain stores to make better decisions about expanding or contracting their store distributions; 3) shopping malls to optimize the physical store layout, mobilize sales force, adjust store mix strategies, streamline store operations, improve user experience, and increase sales conversion and revenue; 4) retail stores to derive a store network, based on which to define complementary and competing stores, identify overlapping consumers, and sharpen their targeting strategy; and 5) brands to understand consumer lifestyles, attitudes, and behavioral characteristics and conduct contextual or behavioral marketing.

Presentation 3 **Following Customer Footprints: Analyzing Competitive Structure of Offline Stores and Customer Segmentation**
Eunkyung An[1], Xiao Liu[1], Baohong Sun[2], Natasha Zhang Foutz[3], [1]New York University, New York, NY, [2]Cheung Kong Graduate School of Business, New York, NY, [3]University of Virginia, Charlottesville, VA
Abstract: As nearly 90% of retail revenues occur offline, we propose a framework to assess store substitution and complementarity across industries and derive multi-category consumer segments by leveraging a large-scale data of consumer mobile GPS locations. This is a critical topic yet understudied due to a lack of data. We first extract the key features from the data, such as the shares of visits to each store and shares of co-visits across stores. These features offer important insights on, such as which categories are co-visited, or whether popular locations from the same or different category are more likely co-visited. We then derive the substitution and complementarity structures among stores across industries and the resulting consumer segments by implementing a novel machine learning approach. This approach converts the data into an undirected graph and heterogeneous networks via network embedding. We reveal a list of brands with intense competitive relationships, demonstrate the geographical variations of such competitive structures, and discover consumer segments based on broad cross-category behaviors. These findings offer important insights to marketers, such as the identities of close and distant competitors within industry and potential allies across industries, or how to target consumers with effective cross-industrial promotions.

Presentation 4 **Consumer Choice Predictions Based On Individual Geospatial Patterns**
Qinghua Li[1], Pradeep Chintagunta[2], Federico Rossi[3], Wanqing Zhang[2,3], [1]Northwestern University, Evanston, IL, [2]University of Chicago, Chicago, IL, [3]Purdue University, West Lafayette, IN
Abstract: Gravity models of store choice typically use a consumer's location relative to a store and the store's "attractiveness" as key drivers of that decision. A consumer's consideration set is usually assumed to consist of all the stores available to a consumer (in small, geographically isolated markets) or all stores located within a circle of pre-determined radius from the consumer's location. GPS-enabled mobile devices allow us to leverage consumers' travel patterns to more accurately define consideration sets in a given market. First, we address a critical challenge associated with using raw GPS data (longitude, latitude, and time); how to cluster trajectory points into meaningful characteristic locations (e.g. home, work and shopping place) and trajectory "segments" (e.g., walking, driving or running) for each consumer. We propose a new machine learning method called adaptive-bandwidth-orientation mean-shift (ABOMS) algorithm that also overcomes the uneven spatial density caused by changes in a consumer's movement patterns. Then, using the results from ABOMS, we propose a "Geo-Mobility Based Consideration Set (GMBCS)" definition for each consumer to improve the prediction of aggregate store-choice decisions. With the new GMBCS approach, we first customize individuals' consideration sets by looking at individual travel patterns of consumers in a market. Then we aggregate choice predictions from these individual considerations sets to predict aggregate traffic to each store. We conduct a series of analyses to compare the prediction outcomes of our method with traditional approaches.

Presentation **Session Chair**
Baohong Sun, Cheung Kong Graduate School of Business, New York, NY

Session FD05 **Investor Advertising**
05
12:45 PM - 1:45 PM

Presentation 1 **Advertising And The Initial Public Offering**
Michal Herzenstein[1], Dan Horsky[2], Yi-Lin Tsai[1], Tzachi Zach[3], [1]University of Delaware, Newark, DE, [2]University of Rochester, Pensacola, FL, [3]The Ohio State University, Columbus, OH, Contact: michalh@udel.edu
Abstract: An initial public offering (IPO) is one of the most important events for firms. It is the firm's opportunity to raise capital, expand its operations, and pursue new projects. In a recent example, Zoom video conferencing raised $356.76 million after selling 9.91 million shares for $36 a share during their IPO. Zoom was initially priced between $28 and $32, however closer to the IPO the price range was revised to $33-$35 and finally set to $36. Clearly, as the IPO price increased, Zoom's proceeds increased. Despite the immense effect the IPO price has on the firm, its managers are not the ones who decide its level. IPO pricing is determined in a process managed by the underwriter syndicate hired by the firm's managers, and involves extensive meetings and discussions with institutional investors. While the firm and its underwriters ultimately wish to have a successful IPO, they do have some conflicting goals. The firm's managers wish to increase the IPO price as much as possible, while still having a successful IPO, in order to maximize proceeds. The underwriters wish to price the IPO so as to have some underpricing that will allow the institutional investors some profits and set it at a level that will clear the market (there will not be unsold shares). Our aim is to examine the role that advertising plays in the IPO price setting process. It should be emphasized that the level of advertising spending is determined by the firm's managers. Our dataset includes weekly observed advertising spending, collected by a third party. Using such granulated data we show that firms with higher price revisions increased their advertising spending in the months leading to the IPO. Advertising spending was reduced immediately following the IPO, despite the firm having more available funds that could be allocated to keep advertising at its higher level. On the other hand, we find that firms with minimal price revisions, and even negative ones, did not change their advertising spending before or after their IPO. We pursue the rationale for such managerial behavior.

Presentation 2 *****Late Cancellation***Impact Of Advertising On Investor Behaviors**
Sundar G. Bharadwaj[1], Guiyang Xiong[2], Pengyuan Wang[1], [1]University of Georgia, Athens, GA, [2]Syracuse University, Syracuse, NY
Abstract: While the advertising literature has mostly focused on consumers' reactions to advertising, recent research suggests that firm advertising strategy can also influence investors directly or indirectly. Using large scale cross sectional longitudinal data, this study examines the impact of advertising across various media outlets on investors' search, chatter, and trading of the firms' stocks. Results indicate unequal effects of advertising intensity on different platforms, and reveal the underlying mechanisms of the effects, i.e., advertising not only influences the investor community via its impact on consumers (and thus a firm's revenues or cash flows), but also directly influences investor interest in and attention to the firm's stock.

Presentation 3 **The Effects Of Video Pitch Content And Style On Crowdfunding Success**
Masoud Moradi[1], Vishag Badrinarayanan[1], Fereshteh Zihagh[2], [1]Texas State University, San Marcos, TX, [2]University of New Haven, West Haven, CT, Contact: masoud.moradi@txstate.edu
Abstract: Entrepreneurs have shifted away from traditional fundraising methods to online crowdfunding platforms, which rely on collecting small amounts of money from a large number of individuals to finance a project. On such platforms, video (i.e., pitch) is one of the primary tools that entrepreneurs use to communicate their ideas to potential funders. While the studies in the field of entrepreneurship emphasize the importance of video pitches, prior research on crowdfunding has not investigated the effect of pitch features on crowdfunding success (i.e., raising the needed funds). Research on crowdfunding platforms suggests that both message content (i.e., "what" entrepreneurs communicate) and linguistic style (i.e., "how" they communicate) influence potential funders' decisions. Therefore, this study examines the effects of video pitch content (i.e., dominant topics) and linguistic style (i.e., analytical and emotional language) on crowdfunding success. The data on 500 successfully-funded projects and 500 failed projects were collected from the *Kickstarter* website, a popular crowdfunding platform. The study utilizes two natural language processing tools to extract features that describe successful video pitches. First, a Latent Dirichlet Allocation approach is used to analyze the contents of video pitches and extract the dominant topics in them. Second, linguistic inquiry and word count (LIWC) is applied to identify linguistic styles in pitches. The analyses propose the use of a dynamic storytelling content in the pitches rather than a formal or precise language. In addition, results suggest that creators should design more group-oriented pitch content. Regarding the linguistic styles, emotional language predicts crowdfunding success; however, analytical language is not a significant predictor of success. Moreover, results show that the effect of negative emotion is stronger than the impact of positive emotion. The results of this study help entrepreneurs improve their knowledge of framing video pitches to design more effective campaigns.

Presentation 4 **Acoustic Features And Persuasion: A Case In An Entrepreneurial Setting**
Lu Zhang[1], Olivier Toubia[2], [1]Columbia University, New York, NY, [2]Columbia Business School, New York, NY, Contact: lzhang22@gsb.columbia.edu
Abstract: Although marketing models have made extensive use of "big data" on both text and imagery, auditory information - ubiquitous in TV and radio advertising - has received far less attention. This is especially surprising given the unprecedented amount of unstructured audio data and modern statistical tools to analyze them. To that end, we study the relative importance of content vs. delivery/style in a particularly evocative marketing context: entrepreneurial pitches. Specifically, we focus on which auditory aspects make an entrepreneur stand out early on (e.g., persuasive in making investor pitches; the role of gender funding success). Lay theories about how one should deliver a persuasive speech abound. Using entrepreneurship data from reality TV show "Shark Tank", some preliminary results emerge. Audio features are predictive of final funding outcomes, even more so compared to textual features. Since speech is naturally intertwined with texts, a textual analysis using modified graphical model is employed. Results suggest that males and females speak about different topics and their acoustic features also differ. Moreover, perceptual constructs, such as perceived confidence, also seems to be related to final funding outcomes. We discuss possible avenues for an overarching, integrated analysis.

Presentation **Session Chair**
Lu Zhang, Columbia University, New York, NY

Session FD06 **New Insights on Advertising and Reviews**
06
12:45 PM - 1:45 PM

Presentation 1 **Decomposing the Effect of Advertising: What Happens in the Retail Channel?**
Michaela Draganska[1], **Maria Ana Vitorino**[2], [1]Lebow College of Business, Philadelphia, PA, [2]INSEAD, Fontainebleau, France.
Abstract: The diverging interests of manufacturers and retailers famously give rise to the double marginalization problem but have consequences far beyond pricing. Advertising is another marketing instrument that is under the control of the manufacturer but its ultimate effect on consumer demand also depends on retailers' pricing decisions. Using a data set covering 11 products categories and 38 brands, we establish that the retailer acts strategically in response to manufacturer advertising by changing retail prices instead of following a simple constant-markup policy. To further explore the role of the strategic response of the retailer in a systematic fashion, we employ a theoretical model of channel interactions in price and advertising, and analytically decompose the effect that a change in advertising by the manufacturer will have on consumer demand. The decomposition highlights the difference between the direct effect of advertising on demand, which underlies measures such as advertising elasticities, and the indirect effect that comes about because the retailer adjusts prices in response to the demand shift caused by advertising. To illustrate this decomposition, we estimate a discrete-choice model of demand for one of the product categories in our data and determine the magnitude of the direct and indirect effects. We find that the indirect effect of advertising through retailer prices is of sizable magnitude and thus substantively affects the assessment of advertising effectiveness.

Presentation 2 **Does TV Advertising Increase Online Sales: The Role of Inter-temporal Substitution**
Xu Zhang[1], Anja Lambrecht[1], Catherine Tucker[2], [1]London Business School, London, United Kingdom; [2]MIT, Cambridge, MA
Abstract: Firms use offline advertising to drive online browsing and sales. However, while a recent literature has demonstrated a surge in online activity in the minutes following TV advertising, there is limited evidence on the extent to which offline advertising indeed leads to a sustained significant uptake in online sales. We investigate the effect of TV advertising on browsing and sales accounting both for the instant effect as well as for an aggregate effect across a time window covering multiple weeks. Using evidence from a field test conducted by an online travel company, we confirm similar findings as in previous literature that TV advertising has a positive instant effect on both online browsing and online sales. However, this instant effect does not translate into an increase in either browsing or sales over a period of multiple weeks, implying that the firm does not see an increase in revenue as a result of the TV advertising campaign. We document consumers' inter-temporal substitution as the mechanism behind this aggregate null effect. The findings indicate that rather than focusing on instantaneous spikes marketing managers should consider a longer time window when evaluating the effectiveness of TV campaigns on online purchases.

Presentation 3 **Identifying substitution patterns using product reviews**
Jurate Liaukonyte, Cornell University, Ithaca, NY
Abstract: Determining which products are close competitors in a differentiated product market is a key question in marketing and industrial organization. The closeness of competition between any two products is determined by the degree of consumer substitutability between them and directly informs firm's optimal price setting. However, estimating demand and thus the substitutability in online marketplaces is becoming computationally complex and not easily scalable due to the large number of products and not easily identifiable relevant product characteristics. We argue that consumer reviews present a promising, free alternative for analyzing product similarity and ultimately predicting substitution patterns. The key idea is that the co-occurrence of words and the sentiment with which the products are described in customer reviews for any two products is a strong predictor of their substitutability. Specifically, we propose an unsupervised machine-learning approach to determine product similarity by analyzing 1.8 million of Amazon product reviews across 14 different product categories. We first generate word embeddings by training Word2vec - a shallow, two-layer neural networks - on the corpus of all consumer reviews in each product category. The resulting vector space represents the distributed numerical representations of the word features in these product reviews. We subsequently analyze the words used in a product's reviews to position the product in the product vector space. The resulting Euclidian distance between any two products approximates the degree of substitutability between them. Finally, using daily price and sales rank data within each category, we estimate product demand and thus own- and cross-price elasticities. We show that our measures of Euclidian distances generated from product reviews predict estimated cross price elasticities. Our proposed method provides an alternative and easily accessible approach to estimating product substitutability and price sensitivity from consumer generated content alone, without requiring any sales data.

Presentation 4 **Do Spoilers Really Spoil? Using Topic Model To Measure The Effect Of Spoiler Reviews On Box Office Revenue**
Jun Hyun Ryoo[1], Xin Wang[1], **Shijie Lu**[2], [1]Western University, London, ON, Canada; [2]University of Houston, Houston, TX
Abstract: A sizable portion of online movie reviews contains spoilers, defined as information that prematurely resolves narrative uncertainty. In this research, the authors study the financial consequences of spoiler reviews based on daily box office revenue and online word-of-mouth data for movies released in the United States between January 2013 and December 2017. To operationalize the degree of spoiled contents, the authors distinguish between spoiler volume and spoiler intensity, measuring the latter using a correlated topic model based on review content. Using a dynamic panel model with movie fixed effects and appropriate instrumental variables, the authors find a significant and positive relationship between spoiler intensity and box office revenue with an elasticity of .06. Such a positive effect of spoiler intensity is more prominent for movies of limited release, smaller advertising spending, moderate user ratings, and is stronger in earlier periods of a movie's life cycle. Results from online experiments provide complementary evidence in support of the uncertainty-reduction mechanism of spoiler reviews. Our findings suggest review platforms should increase the accessibility of spoiler reviews to facilitate a better fit between movies and consumer preferences. In addition, movie studios should monitor spoiler reviews to better forecast box office revenues.

Presentation 5 **Charting the Path to Purchase using Topic Models**

Alice Li[1], Liye Ma[2], [1]The Ohio State University, Ohio, OH, [2]College Park, MD

Abstract: In gathering information for an intended purchase decision, consumers submit search phrases to online search engines. These search phrases directly express the consumers' needs in their own words and thus provide valuable information to marketing managers. Interpreting consumers' search phrases renders a better understanding of consumers' purchase intentions, which is critical for marketing success. In this paper, we develop an integrated model to connect the latent topics embedded in consumers' search phrases to their website visits and purchase decisions. We provide implementations both in discrete state space and continuous state space for richer generalizability. Using a unique dataset provided by a hospitality firm which contains more than 8,000 search phrases submitted by the consumers, our model identifies latent topics underlying the searches that led consumers to the firm's website. Compared to a model without any usage of the textual information in consumers' search phrases, or a model with existing heuristics such as the Latent Dirichlet Allocation, our model provides a better evaluation of a consumer's position on the path to purchase and achieves much better predictive accuracy based on five-fold cross validations. We also extend our discussion on the aggregator websites and segments of consumers who are exposed to the firm's outbound ads. Marketing managers can use our method to extract structured information from consumers' search phrases to facilitate their inference of consumer's latent purchase state and keyword selection.

Presentation **Session Co-Chair**

Anja Lambrecht, London Business School, London, United Kingdom.

Presentation **Session Co-Chair**

Catherine Tucker, MIT, Cambridge, MA

Presentation **Session Chair**

Xu Zhang, London Business School, London, United Kingdom.

Session FD07 **Marketing & Politics**
07
12:45 PM - 1:45 PM

Presentation 1 **It Takes Courage! How Corporate Activism Inspires Political Participation**
Daniel Korschun, Philadelphia, PA
Abstract: Individual political participation is a fundamental ingredient for democracy. Yet, research indicates a global increase in the number of people who are disengaged in the political process. Our research asks whether companies, through their own public statements on contentious social or political issues, can encourage consumers to participate politically. In two experiments, we provide evidence that such corporate activism can encourage political participation to the extent that it is perceived by the consumer to be morally courageous. This mediating effect is stronger when the consumer shares the view of the company engaged in the activism (what we call low political ideology distance). Moreover, delving deeper, we find that perceived moral courage can be heightened when the company takes a leadership position in its corporate activism by announcing their stand before industry peers. Broadly speaking, the research portrays consumers as potentially emulating companies that they believe act on principle despite the apparent risk of doing so.

Presentation 2 **The Role Of Consistency And Slant In Political Advertising**
Beth Fossen[1], Donggwan Kim[2], David A. Schweidel[3], **Raphael Thomadsen**[2], [1]Indiana University, Bloomington, IN, [2]Washington University in St Louis, St. Louis, MO, [3]Emory University, Atlanta, GA
Abstract: Although political ad spending has been growing consistently over the past years, very little is known about what kinds of advertising messages are effective in boosting favorable audience response. Combining data on political advertising, online chatter, website traffic and daily poll, we explore the relationship between ad content in political advertising and immediate audience responses. We first find that centrist messages relate to increases in online chatter and website traffic and similarly ad messages that sound consistent with the candidate's characteristics in language are associated with increases in online chatter and website traffic. Additionally, politically extreme and inconsistent ad messages relate to a decrease in daily poll outcome, but the effect varies significantly over time, with extreme and inconsistent messages hurting most very close to the election. These results suggest that political candidates should deliver centrist and consistent messages through advertisements, and it would become increasingly important as the Election Day approaches.

Presentation 3 **Impact Of Political Television Advertisements On Viewers' Response To Subsequent Advertisements**
Beth Fossen, Girish Mallapragada, Anwesha De, Indiana University, Bloomington, IN
Abstract: Political advertisements on television can affect viewers and may, consequently, influence the effectiveness of subsequent ads. Such ad-to-ad spillover effects - where one ad influences how individuals respond to a subsequent ad - have drawn concerns from non-political advertisers, raising the question: how do political ads on television impact viewers' response to subsequent ads? We empirically investigate this question using two outcomes of ad response: ad viewership and online conversations about ads. We use data on 849 national political television ads from the 2016 election and leverage a quasi-experimental design to delineate the effect that a political ad has on the subsequent ad. We show that, counterintuitively, political ads spur positive spillover effects. Specifically, we find that ads that follow a political ad, compared to ads that follow a non-political ad, experience an 89% reduction in audience decline and, thus, air to larger audiences. Additionally, we find evidence that viewers engage in more positive online ad chatter about ads that air after political ads, with these ads experiencing a 4% increase in positive chatter post-ad. Our investigation contributes to research on advertising that has yet to explore ad-to-ad spillover effects and, more broadly, provides insights into how political messages influence consumers.

Presentation **Session Chair**
Beth Fossen, Indiana University, Bloomington, IN

Session FD08 **Platforms III**
08
12:45 PM - 1:45 PM

Presentation 1 **Crowdsourcing In The Sharing Economy: Early-life Socioeconomic Instability As A Barrier**
Yuechen Wu, Meng Zhu, Johns Hopkins University, Baltimore, MD
Abstract: This paper examines one fundamental factor that impacts crowdsourcing in the sharing economy: early-life socioeconomic (in)stability. Results from a pilot, five preregistered studies (*N*=1,585), and a nation-level field dataset (*N*=57,155) reveal that early-life socioeconomic instability decreases participation in the sharing economy as service providers. Further, we identify greater territorial feelings as a central mechanism driving this effect.
In the pilot study, participants reported their past crowdsourcing experiences across three domains (Airbnb, community resource-sharing platforms, Uber/Lyft). We found that lower early-life socioeconomic stability people are less likely to provide services (controlling for current SES) in all three contexts. In the three preregistered replication studies, each participant reported their past crowdsourcing experience in one domain. We found the same effects in the Airbnb and resource-sharing domains, and a marginal effect in the ride-sharing domain.
Study 2 used a real behavioral DV. Participants read about a car-sharing platform (TURO), and chose between reading an article about how to list cars on Turo, or a recent news article about Turo. Lower early-life stability people were less likely to read the article about listing cars on Turo, suggesting a reluctance of participating in sharing economy.
Study 3 used a field dataset from China. We used maternal education attainment as a proxy for early-life stability (high vs. low: mother completed some formal vs. no formal education). Using propensity score matching, people with low (vs. high) stability were less likely to rent out a spare room, controlling for mother's year of birth, current household SES, house space, age, education and job types. We also used a regression model with parents' SES as a proxy for early-life stability, and found similar effects.
Study 4 explored the underlying process. We found early-life instability decreased willingness to list a spare room on Airbnb. We coded the open-ended responses and found that territorial feelings mediated this effect.

Presentation 2 **Quantity Versus Quality: Revisited in the Knowledge-sharing Platform**
Maiju Guo[1], Jian Ni[2], Qiaowei Shen[3], Yan Xu[4], [1]Peking University, Beijing, China; [2]Johns Hopkins University, Baltimore, MD, [3]Peking University, Beijing, China; [4]The Hong Kong Polytechnic University, Hong Kong, China. Contact: guomaiju@pku.edu.cn
Abstract: Online knowledge-sharing platforms provide potential learners with an unprecedented way to build up their human capital. Such a Q&A format is very useful for learners to quickly master certain topics of knowledge. However, the performance of such a platform critically depends on both the quality and the quantity of knowledge contributed by the crowd. This paper examines the quantity-quality trade-off (Becker and Lewis, 1973, JPE) in these platforms. Using a novel data that combines the text and graphs (unstructured data) in the shared knowledge, the perceived quality of knowledge and the historical activities as well as characteristics of the knowledge contributors, this paper reports a negative relationship between the quality of earlier knowledge and the future knowledge-generation by the crowd. Our main results revolve around whether the quality and the contributor's expertise level of the earlier knowledge content influence the crowd's knowledge production in the future. We find that the quality of earlier knowledge has a negative impact on both the quantity and the quality of knowledge contributed by the crowd in the future. We also find that this negative impact is amplified when the earlier knowledge is contributed by an expert. Our findings have important implications for knowledge-sharing platforms, in particular, that the interrelationship of earlier knowledge contributed by different types of the crowd and future knowledge are key drivers of platform growth.

Presentation 3 **Optimal Transactional Pricing For Two-sided Markets: Evidence From The Tourism Industry**
Prabhanjan Didwania, Karsten Hansen, University of California, San Diego, San Diego, CA, Contact: pdidwani@ucsd.edu
Abstract: This paper investigates fees in a two-sided market, where customers purchase accommodations, flights and entertainment tickets for a large tourist destination. While consumers can directly purchase from supply side agents, platforms are used for the ease of purchasing or "discounted" pricing and in turn assess a transactional fee. The question for platforms is simple - at what fee does the platform maximize profits? We examine transaction and web activity data from a market-specific network for one of the largest tourist destinations in the world. The platform faces competition from larger and more popular networks. This competition leads to supply-side multihoming and relatively lower positive network effects for customers, forcing the platform to adjust pricing and advertise to attract customers. Using a binary logit model, we find the optimal fee for the platform for each type of transaction. This model is applied across customers with various different trip motivations, distance to market and demographics. Potential applications for this analysis are discussed and extrapolated for other types of platform competitors and two-sided markets.

Presentation 4 **Women Marketers: An Investigation Of Gender Discrepancy In The Gig Economy**
Dalal Ahmad, Kuwait University, Shedadiah, Kuwait.
Abstract: Research investigating gender discrepancy in the marketing profession, although limited, has addressed barriers, such as the glass ceiling effect, for women in marketing management; the underrepresentation of women in managerial and executive positions; and workplace inequality in the advertising industry. However, with the advent of new forms of flexible employment, typified by the opportunities of the gig economy, we have no understanding of gender discrepancies for marketers in the gig economy. To explore whether women marketers in the gig economy are faced with payment discrimination, we examined this research question using data collected from an online hiring platform. We conclude this paper by discussing managerial implications, and insights for gender discrepancy in marketing.

Presentation **Session Chair**
Dalal Ahmad, Kuwait University, Shedadiah, Kuwait.

Session FD09 **Applied Choice Experiments**
09
12:45 PM - 1:45 PM

Presentation 1 **Maxdiff Analysis Of Core Values And Ideological Alignment**
Kenneth Fairchild, Sawtooth Software, Provo, UT
Abstract: Best-Worst Scaling hasn't seen much academic attention in the political space. However, there are many opportunities for exploration of how people evaluate different propositions and what drives decisions using choice modelling. In this study we will explore how respondents assess certain personal and public values and see how strongly we can determine ideological leanings based on core values. We will do this by first administering a Best-Worst Scaling exercise about the relative importance of different values. Following the Best-Worst Scaling exercise, respondents answer demographic questions about political affiliation, presidential candidate sentiments, and so on. We combine this data to create a typing tool to try and recreate respondent's political leanings and show any interesting segment-based findings.

Presentation 2 **A Comparison Of Traditional And Bespoke Partial Profile Choice Based Conjoint Methods**
Megan Peitz, Numerious, Michigan, MI
Abstract: Most of the choice-based research done today is full profile (FP), where a level from every attribute is shown in every product profile. However, some argue that there comes a point when a FP choice task is too cumbersome and overwhelming, forcing respondents to use a simplification heuristic that could affect the model's predictability. Since the work of Green and Srinivasan (Green, P. & Srinivasan. 1978), we have been historically taught to use around six attributes (depending on level text, category, and more). One solution to this problem includes Partial Profile (PP). PP is where a level from only a subset of attributes, usually 7 or fewer, is shown in every product profile. The subset of attributes changes across every screen so that respondents evaluate all attributes, but only 7 at a time. (Chrzan, K., & Elrod, T. 1995) However, some research has shown a negative impact on changing attributes across screens within the individual lending to a longer and more complicated exercise. In addition, a bespoke set of attributes may offer a more accurate representation of utility impact. This paper sets out to compare the standard approach to PP against a bespoke approach, where only the levels of an attribute that a respondent says are important, are shown in every product profile. Therefore, in the bespoke approach the subset of attributes stays the same across every screen so that respondents only evaluate a subset of the total attributes.

Presentation 3 **Using Decision-Rule Robust SCE Designs To Distinguish RRM From RUM Choosers**
Derrick Hyde[1], Keith Chrzan[2], [1]Sawtooth Software, Provo, UT, [2]Sawtooth Software, Chesterton, IN
Abstract: Chorus (2010) introduced random regret minimization (RRM) models as an alternative to the random utility (RUM) paradigm. Designs optimized for a model assuming a RUM decision rule might be inefficient if used to collect data for a model based on a RRM decision rule and vice versa (van Cranenburgh, *et al.* 2018). Subsequently van Cranenburgh and Collins (2019) proposed constructing robust designs that work for both decision rules, and they provided code to effect such designs using Ngene software. In an empirical study, we analyzed respondents with RUM and with the most interesting variant of RRM, p-RRM (van Cranenburg *et al.* 2015), using hierarchical Bayesian multinomial logit (HB-MNL) to estimate respondent-level utilities in both cases. Many respondents fit the two models about equally, or neither model well, but 158 respondents' utilities fit the RUM model well and better than they fit the p-RRM model. Conversely, 183 respondents' utilities fit the p-RRM model well and better than they fit the RUM model. Using agents programmed to act with these two populations' utilities, we test whether a match between the decision rule respondents use and the decision rule we assume in making a design makes for better-fitting models. We will test the extent to which our conclusions about which model fits which population better depend on our choice of experimental design. Further, we want to learn whether using a robust design allows us to distinguish known RRM from known RUM choosers. If we can make this distinction reliably, then we hope that accounting for differences in decision rules in mixed samples of respondents improves our predictions about preferences. For this final comparison, we use p-RRM and RUM models run on a sample of 378 human respondents and use those models to predict the choices among a validation sample of 316 holdout respondents.

Presentation **Session Chair**
Keith Chrzan, Sawtooth Software, Chesterton, IN

Session FD10 **Bayesian Methods and Applications**
10
12:45 PM - 1:45 PM

Presentation 1 **Hierarchical Marketing Mix Models With Sign Constraints Using Hamiltonian Monte Carlo**
Hao Chen, Minguang Zhang, Lanshan Han, Alvin Lim, Precima, a Nielsen company, Chicago, IL, Contact: hao.x.chen@nielsen.com
Abstract: Marketing mix model (MMM) is a statistical model to measure the effectiveness of different marketing activities such as promotion, media advertisement, etc. In this research, we propose a comprehensive marketing mix model that captures carryover, shape and scale effects of certain marketing activities by introducing non-linear functions with unknown parameters. The introduced parameters are simultaneously learned together with unknown regression parameters by Bayesian paradigm using Hamiltonian Monte Carlo approach. The proposed model also includes hierarchical effects and allows for sign constraints on the regression parameters to be estimated. Compared to existing literature, we not only employ a novel approach to estimate the unknown parameters simultaneously, but also provide concrete examples with hierarchical effects that allow sign constraints, which is useful for practitioners.

Presentation 2 **Identify Experts Through Revealed Higher Order Variances: Application To Wisdom Of Crowds**
Yunhao (Jerry) Zhang[1], Drazen Prelec[2], [1]MIT Sloan, Cambridge, MA, [2]Massachusetts Institute of Technology, Cambridge, MA, Contact: zyhjerry@mit.edu
Abstract: We propose a simple algorithm that improves Wisdom of Crowds by identifying experts from the crowds. We first propose an information structure based framework where agents form their initial beliefs based on what they learn from the underlying information sources. Then through a Bayesian updating model, we show that our simple algorithm induces revelation of both first-order variance (uncertainty of initial estimate or uncertainty within the information an agent has) and second-order prior variance (uncertainty of uncertainty of initial estimate or uncertainty towards an agent's unknown information); yet conventional algorithms only elicit the former. Our empirical results suggest that our revealed confidence algorithm (RC) is generally more preferable to conventional Wisdom of Crowds (simple average or median). Our algorithm is also comparable to the "Surprisingly Popular algorithm" proposed in Prelec et al. 2017 in binary questions. Finally, we return to discussion of our proposed framework and argue that the framework not only provides one explanation why our RC algorithm works better than some existing methods but also allows a more general interpretation of the Wisdom of Crowds phenomenon.

Presentation 3 **Hard And Hidden Facts: Using A Paired Response Technique To Quantify Illegal Purchases Of Medicines**
Marco Gregori[1], Martijn G. de Jong[2], Rik Pieters[3], [1]Erasmus University, Rotterdam, Netherlands; [2]Erasmus University, Rotterdam, Netherlands; [3]Tilburg University, Tilburg, Netherlands. Contact: gregori@ese.eur.nl
Abstract: The results of surveys may be compromised when participants fail to provide their true answers, which is likely when the survey concerns sensitive topics. We propose a Paired Response Technique to elicit truthful responses to sensitive questions in surveys. The technique is suitable for the most commonly used response formats: binary, multiple choice, or ordered. To the best of our knowledge, the proposed methodology is the first that does not require use of a randomization device for any of the aforementioned response formats, significantly simplifying data collection. Further, it allows for individual-level predictions of engagement in the sensitive behavior, in contrast to most existing methods. The model is applied to a novel dataset, in which we focus on legal and illegal purchases of medicines to enhance sexual performance. The incidence of such illegal purchases is unknown, and self-reports are currently the only way to estimate the incidence and drivers of the phenomenon. Unfortunately, consumers are rarely willing to disclose this information. The results of the empirical analyses indicate that such purchases are mostly carried out illegally, despite the dangers associated with this behavior. Validation checks support the main results of our study.

Presentation 4 **Multi-view Topic Model For Purchase Prediction**
Samuel Levy[1], Dokyun Lee[2], Daniel McCarthy[3], Alan Montgomery[2], [1]Carnegie Mellon University, Pittsburgh, PA, [2]Carnegie Mellon University, Pittsburgh, PA, [3]Goizueta Business School, Emory University, Atlanta, GA, Contact: silevy@andrew.cmu.edu
Abstract: Predicting and understanding when customers will buy is crucial for marketing managers who allocate marketing efforts in a timely manner. We propose a new approach to predict what and when customers of non-subscription companies will buy. At non-subscription companies, some customers place orders on a more regular basis, while others do so at sparser intervals, making this a challenging environment for predicting new customer activity using traditional approaches that rely entirely upon transaction data. We augment this transaction data with clickstream data through a Bayesian model to predict what product category customers will purchase and when purchases will take place. Our model clusters customers into transaction and clickstream topics, which depicts profiles of customers and their relative economic potential, and relates these topics to how long customers wait to buy. The profiles of topics and customers are directly interpretable and are of use to marketing managers engaging in promotional activities for customers. Our method discovers relationships between the timing of transactions and clickstream activity that other methods have not been to uncover.

Presentation **Session Chair**
Samuel Isaac Levy, Carnegie Mellon University, Pittsburgh, PA

Session FD11 **Healthcare Marketing**
11
12:45 PM - 1:45 PM

Presentation 1 **Direct-to-consumer Advertising for Doctors? Uncovering the Effect of Pharmaceutical Advertising on Health Care Providers' Prescribing Behavior**
Tongil Kim, Emory University, Atlanta, GA
Abstract: Studies have found that television advertising is an effective marketing tool to increase sales of prescription drugs. Known as direct-to-consumer advertising, it has become one of the largest spending categories in the American television advertising market. Its effect on health care providers, however, has never been studied. By examining health care providers who move to regions with varying levels of television drug ad exposure and their prescription behavior, I document the effect of prescription drug advertising on health care providers even though they are not considered as the primary target of the ads. After controlling for differences in patient characteristics, the baseline advertising level, and other factors such as detailing, providers moving to a region with 1% more television advertising of a drug increase their prescriptions of the drug by 0.010-0.027%. The unintended effect mostly arises from advertising of newer drugs, whereas it is not statistically significant for older drugs, suggesting an informative role of advertising. The effect does not differ across provider's experience, gender, or primary care provider status. It is, however, larger for providers who are sole proprietors—providers with more independence in prescribing drugs—than those work at hospitals or physician groups.

Presentation 2 **Intra-Household Spillovers in Healthcare Utilization and Health Outcomes for Chronic Diseases**
Sriram Venkataraman, UNC-Chapel Hill, Chapel Hill, NC
Abstract: More than 40 percent of all individuals in the U.S. receive their health insurance through their employers. On average these households spend more than 10 percent of their household income on healthcare, including premiums, deductibles, out-of-pocket expenses, taxes, etc. As healthcare costs rise, financial pressure is leading more and more families to defer/delay utilization of much-needed healthcare. These trends are exasperated by growing rates of adoption of high-deductible health insurance plans and increasing rates of family members with chronic diseases like diabetes, high blood pressure, obesity, asthma, etc. Do individuals within a household adjust their healthcare utilization in response to a serious medical condition of another member of the same household? How do their healthcare utilization adjustments vary when the household switches insurance plans (e.g., non-HDHP to HDHP)? Do they adjust utilization of needed or discretionary care? Do they adjust healthcare utilization of genetically transferable/non-transferable chronic medical conditions? The study answers these aforementioned questions leveraging a rich new database containing individual-level claims data from a representative sample of employers who collectively insure 40 million households in the U.S. The study augments prior research in public health and health economics that almost exclusively focuses on healthcare utilization and health outcomes of individuals diagnosed with a chronic disease. In contrast, this study investigates the spillover effects of a chronic diagnosis of one member of the household on healthcare utilization and health outcomes of other members of the same household.

Presentation 3 **The Effect of Hospital Advertising on High Technology Procedures: Evidence from Robotic Surgeries**
Tae Jung Yoon[1], Tongil kim[2], [1]University College London, London, United Kingdom; [2]Emory University, Atlanta, GA
Abstract: High-technology procedures such as minimally invasive surgery have widely been adopted in medicine. Many hospitals in the US advertise these procedures to signal their high quality of care. In this paper, using a TV advertising data and a hospital discharge data from Florida, we investigate how hospital advertising on high-tech procedures affects patients' choice of surgical procedures and their treatment outcome in the domain of robotic surgeries. We find that advertising high-technology procedures induces more patients to receive such procedures compared to conventional procedures and pay higher medical costs. However, depending on disease types and patient status, it is still uncertain whether these procedures improve treatment outcome enough to cover their high costs.

Presentation 4 **Accessibility, Affordability, and Convenience of Online Pharmacies**
Manuel Ignacio Hermosilla[1], Jian Ni[1], Haizhong Wang[2], Jing Zhang[3], [1]Johns Hopkins University, Baltimore, MD, [2]Oregon State University, Corvallis, OR, [3]JNU, Baltimore, MD
Abstract: A growing number of patients around the world are now acquiring many of their medications through online pharmacies (online drug retailing). Yet, there currently exists little systematic evidence that characterizes the sources of benefit that online pharmacies may provide to these consumers relative to traditional offline sources. This literature gap is perhaps not surprising given that it is difficult to compile datasets with information on both online and offline drug purchases. In this research we address this gap by leveraging a rich dataset of online pharmacy transactions from a large Chinese retailer and a policy change that implied the drastic reduction offline prices for selected products in eleven large Chinese cities. By measuring accessibility through the strength of each locality's public healthcare system, affordability through online/offline price differentials, and convenience through geographically-driven variation in delivery times, we estimate the contribution of each of these factors to a consumers' utilities across chronic and acute disease categories. Implications are drawn based on the nuanced portrait of the sources of value that online pharmacies offer to consumers.

Presentation **Session Chair**
Manuel Ignacio Hermosilla, Johns Hopkins University, Baltimore, MD

Saturday, June 13, 2020
Session "SA"
9:00 AM - 10:00 AM

SA01. Machine Learning Applications I

SA02. Analyzing Unstructured Data for Better Marketing Decisions

SA03. Game Theory in Sales Management

SA04. Pricing I

SA05. Reviews II

SA06. Technology, AI and (Un)intended Consequences

SA07. Marketing and Welfare I

SA08. Modeling Firms Strategic Decisions with CRM data

SA09. Digital Marketing Applications

Session SA01 **Machine Learning Applications I**
01
9:00 AM - 10:00 AM

Presentation 1 **Dynamic Marketing Policies: Constructing Markov States For Reinforcement Learning**
Duncan I. Simester[1], **Yuting Zhu**[2], [1]MIT, Cambridge, MA, [2]Massachusetts Institute of Technology, Cambridge, MA, Contact: yzhu44@mit.edu
Abstract: Many firms want to target their customers with a sequence of marketing actions, rather than just a single action. We interpret sequential targeting problems as a Markov Decision Process (MDP), which can be solved using a range of Reinforcement Learning (RL) algorithms. MDPs require the construction of Markov state spaces. These state spaces summarize the current information about each customer in each time period, so that movements over time between Markov states describe customers' dynamic paths. The Markov property requires that the states are "memoryless," so that future outcomes depend only upon the current state, not upon earlier states. Even small breaches of this property can dramatically undermine the performance of RL algorithms. Yet most methods for designing states, such as grouping customers by the recency, frequency and monetary value of past transactions (RFM), are not guaranteed to yield Markov states. We propose a method for constructing Markov states from historical transaction data by adapting a method that has been proposed in the computer science literature. Rather than designing states in transaction space, we construct predictions over how customers will respond to a firm's marketing actions. We then design states using these predictions, grouping customers together if their predicted behavior is similar. To make this approach computationally tractable, we adapt the method to exploit a common feature of transaction data (sparsity). As a result, a problem that faces computational challenges in many settings, becomes more feasible in a marketing setting. The method is straightforward to implement, and the resulting states can be used in standard RL algorithms. We evaluate the method using a novel validation approach. The findings confirm that the constructed states satisfy the Markov property, and are robust to the introduction of non-Markov distortions in the data.

Presentation 2 **Design Gaps: Using Deep Learning To Balance Consumer Demand And Engineering Costs**
Alex Burnap[1], John R. Hauser[2], [1]Massachusetts Institute of Technology, Somerville, MA, [2]MIT, Cambridge, MA, Contact: aburnap@mit.edu
Abstract: Successful firms design products that meet consumer demand, are feasible to produce, and sell at a premium over costs. Products without consumer demand create no revenue, while products that do not consider design feasibility are overwhelmingly costly to produce (if not infeasible). Marketing science has a long history of identifying design gaps, usually in perceptual space, that lead to the greatest revenue (and sometimes profit). More recent models consider design costs, but the challenges in implementation have been the scale of the practical problem. (1) With today's data, we often have hundreds of variables (and corresponding machine learning models) from which to model demand. And, (2) Proposed engineering models, built from the bottom up, quickly become infeasible for realistic problems, For example, an automotive-vehicle design requires hundreds of person-years of effort. But even everyday products are complex engineering challenges. Using extensive data available in the automotive industry, 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. An efficient search algorithm balances exploration and exploitation to identify "design gaps" and, in doing so, generates feasible and profitable new product concepts. We test our approach with both synthetic and empirical data from the US automotive market. The data are based on over one million revealed purchases. Consumers are represented by 1,500 attributes and feasible automotive designs are represented by 2,500 attributes. Preliminary results suggest that it is possible to identify "design gaps" enabling firms to search more efficiently for profitable new products.

Presentation 3 **Functional Data Analyses For The Self-presenter's Paradox: *When* Customer Care Should Be Warm Versus Competent**
Yang Li[1], Grant Packard[2], Jonah Berger[3], [1]Cheung Kong Graduate School of Business, Beijing, China; [2]York University, Toronto, ON, Canada; [3]University of PA- Wharton, Philadelphia, PA, Contact: yangli@ckgsb.edu.cn
Abstract: We apply functional data analysis (FDA) and machine learning to study the language of customer care interactions and shed new light on the psychological conceptions of the self-presenter's paradox (a.k.a. the competence-warmth trade off). Human conversation is inherently dynamic, making it naturally amenable to functional data analysis. However, linguistic measurements in a conversation are inevitably irregular and sparse, while classical FDA only handles regular and dense data. Therefore we model the sparse functional data as random trajectories realized from latent smooth functions, and apply functional principle component analysis to the smoothed trajectories to enable functional regression. Also, human conversation often contains a large variety of linguistic and vocal features, leading to a "wide" data situation in which variables greatly outnumber observations. To accommodate such high-dimensionality within FDA, we use group-lasso from machine learning to regulate functional regression on sparse data. Applying our model on two unique datasets of customer care conversations, we show that, rather than being *either* warm or competent, customer service agents can optimize customer perceptions and purchase outcomes by shifting between more affective ("warm") versus cognitive ("competent") language at particular times *within* the interaction. To our knowledge, this is the first study to combine functional data analysis and machine learning to address the specific challenges in modeling human conversation.

Presentation 4 **Will They Sign? Predicting The B2B Contract Pipeline With Structured And Unstructured Data**
Paul R. Messinger[1], Aly Megahed[2], Hamid Motahari Nezhad[3], [1]University of Alberta, Edmonton, AB, Canada; [2]IBM Research - Almaden, Cupertino, CA, [3]IBM Almaden Research Center, Cupertino, CA, Contact: paul.messinger@ualberta.ca
Abstract: Problem definition: Many companies compete for highly-valued contracts in lengthy tender processes. Our problem is to provide early prediction of whether prospective deals will result in signed contracts. **Academic/Practical relevance**: We address two practical issues related to this fundamental business problem: (a) How can one predict whether a company will win a prospective deal? (b) What are the relative contributions to predictive accuracy of static prospect features (about the project, client, and competitors), dynamic measures of milestones achieved, and subjective reports from sales teams (analyzed through natural language processing)? **Methodology**: We propose a recursive system to predict whether prospective deals will result in signed contracts. This model combines measures of prospect features,

milestones achieved, and a qualitative summary score of the sentiment from weekly sales team reports. We compare our model with machine learning techniques. Our analysis of the text data involves unsupervised and supervised learning with a novel semantic extension of key words. At the end of the paper, we also discuss incentive compatible designs, drawing from the mechanism design literature in game theory. **Results**: Client geography, client industry, past relationship with client, and achieved milestones are important features for model prediction. Adding a qualitative index of text data from weekly sales reports yields mean accuracy of 76% for a parsimonious probit model and 81% for the best of ten machine learning techniques using more predictor variables. This represents an improvement in accuracy of ten percentage points over the associated model using only structured data. Our modeling approach was deployed by a large IT service provider resulting in significant positive impact. **Managerial implications**: 1. Our predictive model produces predictions superior to subjective human predictions. 2. The approach helps managers to (a) allocate resources across sales teams, (b) coordinate work flow, and (c) plan for resource needs.

Presentation **Session Chair**
Paul R. Messinger, University of Alberta, Edmonton, AB, Canada.

Session SA02 **Analyzing Unstructured Data for Better Marketing Decisions**
02
9:00 AM - 10:00 AM

Presentation 1 **The Rise and Fall of Influencers: Evidence from Social Trading**
Verena Schoenmueller[1], Barak Libai[2], Shimon Kogan[3], [1]Università Bocconi, MILANO, Italy; [2]Interdisciplinary Center (IDC), Herzliya, Israel; [3]Interdisciplinary Center (IDC), Herzliya, Israel. Contact: verena.schoenmueller@unibocconi.it
Abstract: There has been enduring interest across the social sciences in the power of individuals ("influencers") who have a disproportional effect on others, labeled influentials, opinion leaders, hubs and influencers. We depart from past conventional wisdom, both academic and industry, that had taken a static view of influencers and investigate the life cycle of influencers over time. The dynamic view of influencers suggests that the value of the influencer may depend on the stage of her life cycle, and the relative effect of adoptions and churn. Our study enables us a rare look at the rise and decline of the following of influencers using data from a global leader in this field of social trading, where a platform that hosts a large community of individuals who invest money in financial products and can follow each other's investments. We find a consistent pattern of a bell-shaped life cycle of rise and fall in the number of followers of an influencer over time. It is characterized by relatively fast growth followed by a more moderate decline. Additionally, the decline in the number of followers does not necessarily stem from an increase in churn. The life cycle we identified is driven most of the pattern the number of acquired customers that that rises and falls over time. Yet, as we demonstrate, even a constant followers churn can create the skewness in the curve that we observe. Thus, our study sheds light on the lifecycle of influencers taking into consideration the evolution over time and distinguishing between the acquisition and churn of users.

Presentation 2 **Development of Firms' Focus on Brand and Customer Management over Time**
Simeng Han[1], Werner J. Reinartz[2], Bernd Skiera[1], [1]Goethe University Frankfurt, Frankfurt am Main, Germany; [2]University of Cologne, Cologne, Germany. Contact: simeng.han@stud.uni-frankfurt.de
Abstract: In today's saturated market, firms need to decide on a suitable go-to-market strategy to make their offers distinctive and profitable. Given that a go-to-market strategy can focus on very different elements which require different skill sets, firms need to choose if they want to focus on brand management, customer management, or both. In addition, there are ongoing discussions about how different approaches' importance develops over time. In our study, we investigate (a) by which mechanism firms go-to-market, (b) how the go-to-market mechanisms are developing over time, and (c) whether structural aspects explain those developments. We adopt a text-mining method to construct a new measure of firms' focus on BM and CM, by analyzing the publicly available transcripts of about 30,000 earnings conference calls of S&P 500 firms. Our results using a sub-sample of 82 firms show that firms' focus on BM and CM develops over time. Furthermore, we find out that go-to-market strategies differ across industries.

Presentation 3 **The Power of Brand Selfies in Consumer-Generated Brand Images**
Jochen Hartmann[1], Mark Heitmann[2], Christina Schamp[3], Oded Netzer[4], [1]University Hamburg, Hamburg, Germany; [2]University of Hamburg, Hamburg, Germany; [3]Mannheim University, Mannheim, Germany; [4]Columbia University, New York, NY
Abstract: Smartphones have made sharing images of branded experiences on social media nearly effortless. Tracking and understanding how brands appear online is relevant to brands both as an indicator of social media brand interest, and to incentivize consumers to create and share certain brand images. This research investigates consumer-generated brand images. Aside from packshots (i.e., standalone product images), the authors identify two different types of brand-related selfie images: consumer selfies, i.e., images featuring both brand logos and consumers' faces, and brand selfies, i.e., invisible consumers holding a branded product. Classifying nearly half a million user-generated brand images across 185 different brands using deep convolutional neural networks and text mining tools to measure consumers' engagement with brands, the authors demonstrate that the three brand image types generate different engagement levels among receivers. Specifically, the authors find that an emerging phenomenon, which they term brand selfies, leads to high levels of brand engagement from consumers. A controlled lab experiment replicates these findings and provides indications on the psychological mechanism.

Presentation 4 **Seeking for the Bias: The Informativeness of Online Reviews**
Andreas Lanz[1], Daniel Shapira[2], Amos Schurr[2], [1]HEC, Paris, France; [2]Guilford Glazer School of Business & Management, Beer Sheva, Israel.
Abstract: Prior research on online reviews finds that ratings commonly have approximately the same mean, especially in consideration sets. Hence consumers are forced to gather more information to form preferences and therefore consider the ratings' distributions, which are mostly extreme distributed. Naturally, the more information is available, the better consumers can form preferences, which is why incentivizing reviews is considered an effective measure. Increasing the number of ratings, e.g., by turning non-frequent reviewers to frequent reviewers, would transform the extreme distribution into a more centered one. In this research we question whether consumers really need more information (ratings) to form preferences. More specifically, based on prospect theory and Weber's law on the just-noticeable difference, we expect that consumers can better distinguish between ratings generated by non-frequent reviewers (extreme distributions) rather than generated by frequent reviewers (more centered distributions). Our preliminary results indicate that consumers are interested in the tails: When offered to read a comment from a certain rating, distributed from one to five stars, they tend to go to the extremes, i.e., they choose to read a comment from someone who rated the product with either one or five stars. In fact, we find that their interest, even when having up to ten comments to sequentially select, forms an extreme (J-shaped) distribution. This provides initial supportive evidence that consumers find extreme distributions (generated by non-frequent reviewers) more helpful. From a managerial perspective, it suggests that nudging by incentivizing reviews is not only costly and potentially inviting untruthful comments and ratings, but it may also not be helpful after all.

Presentation **Session Chair**
Andreas Lanz, HEC, Paris, France.

Session SA03 **Game Theory in Sales Management**
03
9:00 AM - 10:00 AM

Presentation 1 **Long-term versus Short-term Contracting in Salesforce Compensation**
Fei Long[1], Kinshuk Jerath[2], [1]University of North Carolina at Chapel Hill, CHAPEL HILL, NC, [2]Columbia University, New York, NY
Abstract: We examine multi-period salesforce incentive contracting, where sales agents can dynamically choose between a bold action with higher sales potential but also higher variance, and a safe action with limited sales potential but lower variance. We find that when the two periods are independent, a polarized two-period contract that provides both an upside reward and downside protection but does not reward the agent for an intermediate outcome, can strictly dominate a period-by-period contract, because it provides effective incentive for an agent with limited liability to take the bold action. However, when the two periods are dependent through a limited inventory to be sold across two periods, the period-by-period contract can strictly dominate the two-period contract, by allowing the principal more flexibility in adjusting the contract.

Presentation 2 **Sales Force And Profit**
Olivier J. Rubel, UC Davis Graduate School of Management, Davis, CA
Abstract: We propose an analytical investigation of how firms should manage marketing and sales activities that are not maximizing profit.

Presentation 3 **When Half-truths Aren't Half-bad: Sale Reps' Selective Underreporting To Facilitate Market Exchange**
Zuhui Xiao[1], Yi Zhu[2], **Mark Bergen**[2], Mark J. Zbaracki[3], [1]University of Wisconsin - Milwaukee, Milwaukee, WI, [2]University of Minnesota, Minneapolis, MN, [3]Western University, London, ON, Canada.
Abstract: A central benefit of manufacturers' sales reps is their ability to provide sellers with information about prospective buyers. Yet sales reps often selectively underreport this information, which is viewed as a major problem by sellers and academics alike. We feel this is only part of the story. Beyond their economic roles of passing along information, sales reps also manage social tensions between sellers and buyers that can threaten exchange. We show selective underreporting can be beneficial to facilitate exchanges that would be impossible with fully truthful reports. We develop a game-theoretic model in a cheap-talk setting that adds the sales reps' social role, and show when and which piece(s) of information sales reps will underreport to induce buyers and sellers to agree to a deal. We show this makes all three parties better off, generating a Pareto-improving "Selective Underreporting" equilibrium. Our work suggests that half-truths aren't always half-bad and can serve as an essential social lubricant for exchange. This broadens our understanding of the complexity of sales reps' work and sales managers' toolkit for managing underreporting, and suggests new understandings of third parties' roles in a world increasingly focused on information and big data.
Keywords: Sales Reps, Selective Underreporting, Social Tensions, Market Exchange, Cheap Talk, Game Theory

Presentation 4 **Incentives And Burnout: Dynamic Compensation Design With Effort Cost Spillover**
Rob Waiser[1], Jean-Pierre Benoît[2], [1]London Business School, London, United Kingdom; [2]London Business School, London, United Kingdom. Contact: rwaiser@london.edu
Abstract: Fatigue and burnout pose a major threat to employee retention and productivity. These occur when the cost of an employee's effort spills over from one period to the next (i.e. working harder today makes her less willing / able to work hard tomorrow). This 'effort cost spillover' affects the optimal design of incentive compensation but is not captured by the standard principal-agent model that dominates incentive design theory. In this research, we use a dynamic, two-period extension of the principal-agent model to explore optimal incentive design for a worker with effort cost spillover between periods.

Presentation **Session Chair**
Robert Waiser, London Business School, London, United Kingdom.

Presentation **Session Co-Chair**
Yi Zhu, University of Minnesota, Minneapolis, MN

Session SA04 **Pricing I**
04
9:00 AM - 10:00 AM

Presentation 1 **Ripples In The Price Spectrum: Penny Rises And Penny Drops**
Xiao Ling[1], Sourav Ray[1], Daniel Levy[2], [1]McMaster University, Hamilton, ON, Canada; [2]Bar-Ilan University, Ramat-Gan, Israel. Contact: lingx4@mcmaster.ca
Abstract: We analyze a large retail price dataset for evidence of asymmetric pricing in the small (APIS) — where there are statistically more small price increases than small price decreases, and where such asymmetry between the price changes disappear for larger price changes. Despite significant policy and strategic implications of the phenomenon, there are only a handful of papers in the domain. Further, much of the empirical inferences in the extant research, are based on limited data - often single retailer, limited product categories, short time span and legacy data dating back to the 1980s and 1990s. More recently, researchers have also raised concerns about the inherent measurement challenges for small price changes. These call into question - is the phenomenon of APIS widespread, and to what extent are the reported results generalizable to current times? In a partial attempt to answer these questions, and to address the shortcomings of the existing studies, we analyze data that contain more than 20 billion weekly price observations over a 10-year period (2006-2015), covering about 35,000 stores across 161 retailers in the US, and 112 product modules. We take some measures to control for the spurious small price changes which recent literature concerns about. And we introduce an alternative measure of APIS - asymmetry ratio, in addition to asymmetry threshold. We conclude that APIS is a robust phenomenon and it is present even after accounting for potential measurement limitations and for inflation. We find that APIS phenomenon exists across different levels of aggregation - products, retailers, and time periods. We also document evidence of reverse asymmetric pricing in the small (RAPIS). The average APIS thresholds range from 2 cents to 30 cents. The average RAPIS thresholds range from 1 cent to 10 cents. And the average asymmetry ratios of APIS and RAPIS range from 0.2% to 8%. Overall, our study shows large improvement upon existing research. Our results indicate greater generalizability of the phenomena than heretofore indicated in the literature.

Presentation 2 **Pricing When Willingness-To-Pay Will Depend On The Posted Price**
Luc R. Wathieu[1], Marco Bertini[2], Michael O'Donnell[1], [1]Georgetown University, Washington, DC, [2]ESADE, Barcelona, Spain. Contact: lw324@georgetown.edu
Abstract: Pricing based on willingness-to-pay (WTP) measurements presents the special challenge that consumers might adjust their WTP once a specific price is posted. This may be due, e.g., to consumer inference, deliberation, or focalization. This paper proposes a modification of the Becker-DeGroot-Marschak (BDM) WTP elicitation method that probabilistically exposes respondents to an ordinary market where a price is being posted on a take-it-or-leave-it basis. Empirical results from this new method are compared with those obtained through the original BDM technique, in terms of accuracy and reliability of the obtained demand predictions. Deviations between methods are analyzed in order to further understand the behavioral effects of posted price on WTP measurements. We also discuss the role that our technique could play in real contexts of dynamic pricing.

Presentation 3 **The Art Of Art Valuation**
Malek Ben Sliman, Rajeev Kohli, Kamel Jedidi, Columbia University, New York, NY, Contact: mab2343@columbia.edu
Abstract: Wealthy consumers increasingly invest in art which is considered as a more individualistic and exclusive form of luxury consumption. This trend is notably illustrated by the collaborations between luxury companies and famous artists. Yet, the drivers of the financial value of pieces of art are not fully understood. Indeed, even major auction houses are at awe when paintings are sold at prices multiple times higher than what they expected. The purpose of this paper is to deepen our understanding of the art world by investigating the drivers of art valuation. We collected details regarding over 140,000 fine art auction including the paintings' images to address the following questions. First, we use deep learning tools to assess which visual features predict auction prices. Second, we create a network of paintings to establish how creative and influential each painting is. Finally, we shift our focus to artists and model the evolution of artists' reputations over time.

Presentation 4 **Consumer Bidding Behavior And Value: It Matters Not Only What You Win Or Lose But Against Whom**
Stephen Hood[1], Dipankar Chakravarti[2], [1]Virginia Tech, Vienna, VA, [2]Virginia Tech, Ellicott City, MD, Contact: hoodste@vt.edu
Abstract: Normative economic theory suggests that bidders have fixed valuations for target auction objects and their bids reflect this valuation. However, studies of bidding behavior in auctions shows that bidders bid and construct their value for the target object based on factors both intrinsic and extrinsic to the auction. We examine how bidders differ in their bidding and their post auction values for the object as a function of the perceived expertise of the competition.
Participants given a fixed budget bid in a simulated Japanese (ascending with irrevocable exit) auction against competitors (bots) whose perceived expertise (i.e., product category experts, auction process experts and amateurs) was manipulated via an instruction set. Participants could exit the auction at will and won or lost the auction based on a pre-programmed pattern of bot exits. We elicited participants' post auction value (WTA/WTP) for the target object as well as regret and satisfaction measures both immediately after the auction and following an interpolated task.
We find that when bidders compete against product category experts, they bid higher than when competing against auction process experts or amateurs. Moreover, post-auction valuations differ by who bidders won/lost against. Competing against product-type experts drove more enduring post-auction valuations than against process experts or amateurs.

Presentation **Session Chair**
Stephen Hood, Virginia Institute of Technology, Vienna, VA

Session SA05 **Reviews II**
05
9:00 AM - 10:00 AM

Presentation 1 **The Effects Of Online Product Reviews On New Product Adoption With Innovators And Imitators**
QIULI SU, Jianan Wu, Louisiana State University, Baton Rouge, LA, Contact: qsu2@lsu.edu
Abstract: We empirically investigate the effects of online product reviews on new product adoption for two types of customers over time: innovators and imitators by examining the effects of both review content and review numerical information simultaneously. We hypothesize that review emotional content, review rating, review rating variation, and review volume have positive effects on sales of both innovators and imitators, but in different sizes: the effect sizes for innovators are smaller than those for imitators respectively. We find empirical support for our hypotheses using a data set from Amazon. We further discuss the managerial implications of our research findings.

Presentation 2 **The Effect Of Review Reminders On Buyers' Review Writing Behaviors And Platforms' Revenues**
Hana Choi[1], **Minkyung Kim**[2], [1]Simon Business School, University of Rochester, Rochester, NY, [2]UNC Chapel Hill Kenan-Flagler Business School, Chapel Hill, NC, Contact: Minkyung_Kim@kenan-flagler.unc.edu
Abstract: E-commerce platforms often remind buyers to write product reviews. On one hand, reminders can have a positive impact on platform revenues by directly increasing the number of reviews (change in volume), and indirectly increasing sales. On the other hand, reminders affect which buyers write reviews (change in the distribution of review ratings) that may negatively impact future demand. Our study aims to investigate how reminders influence review writers' behaviors and subsequently platforms' revenues. Two unique aspects of our data enable identification of the causal impact of reminders; (i) natural experiments on reminders across a large number of e-commerce platforms and (ii) the depth of individual level information including visit, purchase, and review writing behaviors on the platforms. Preliminary findings suggest that reminders increase the review posting probability for a given individual, but decrease the average ratings. We presume reminders decrease review posting costs and mitigate underreporting biases, resulting in heterogenous treatment effects across buyers (e.g., moderately satisfied buyers start to write reviews more than the others). We will further highlight the subsequent impact on platforms' revenues and discuss implications for review managers.

Presentation 3 **Beyond The Bag-of-words: Customer Review Analysis Using Word Embedding Model Considering Text Topics And Sentiments**
Mirai Igarashi[1], Nobuhiko Terui[2], P. K. Kannan[3], [1]Tohuko University, Sendai, Japan; [2]Tohoku University, Sendai, Japan; [3]University of Maryland-College Park, College Park, MD, Contact: mirai.igarashi.s7@dc.tohoku.ac.jp
Abstract: Modern e-commerce sites mostly have the function of customer review systems, and it plays a critical role to analyze reviews and understand what customers feel about the products and services. In marketing research, for customer review analysis, researchers often employ topic modeling approach, such as latent Dirichlet allocation. However, for deeply understanding the context in which the words are mentioned, it is important to avoid the bag-of-words assumption, ignoring the order of words in the document, and investigate local co-occurrences of words within window as well. Word embedding is one of the approaches capturing the context in which words appear and employed in this research. Moreover, in the proposed model, topics and sentiments of texts are also embedded into the same feature space with word vectors, and it helps to improve the interpretability. In empirical analysis, the authors apply the proposed model for customer review data about some cosmetic products and compare the performance with existing models.

Presentation 4 **Learning from Online Reviews: Review Distortion and Consumer Review Search Behavior**
Mohsen Foroughifar, Hojat Abdolanezhad, U of Toronto, Toronto, ON, Canada.
Abstract: Learning from online reviews is a ubiquitous feature of digital economy. In online markets for new experience goods, forward-looking consumers can strategically delay their purchases to wait for the reviews generated in the early stage of product launch. Reviews often provide helpful information about product quality and help consumers to make informative decisions. But sellers might have an incentive to impact consumer learning via distorting the distribution of reviews. When and how a seller takes advantage of review distortion is not theoretically clear though. We build a game-theoretic model to examine the impacts of review distortion on a monopoly seller's profit and consumer behavior. Our results provide three important insights. First, given the consumer's cost of searching through reviews, a seller benefits from review distortion if and only if consumers are sufficiently patient (high discount factor). This result is robust to exogenous and endogenous number of searched reviews by consumers. Second, a consumer searches for more reviews as her idiosyncratic value for the observable product characteristics is closer to the product's price. Third, given the consumer patience, a seller distorts the review distribution if and only if the consumer's cost of review search is sufficiently large. These results suggest that reviews might be noisier in online markets where consumers value future outcomes, and in markets where the cost of review search is high. Hence, online platforms might need to carefully monitor their review system not to be distorted by sellers.

Presentation **Session Chair**
Mohsen Foroughifar, U of Toronto, Toronto, ON, Canada.

Session SA06 **Technology, AI and (Un)intended Consequences**
06
9:00 AM - 10:00 AM

Presentation 1 **YouTube and Product Echo Chambers**
Catherine Tucker, MIT, Cambridge, MA

Presentation 2 **The Effect of Voice AI on Purchase and Search Behavior**
Chenshuo Sun[1], Zijun Shi[2], Xiao Liu[1], **Anindya Ghose**[1], Xueying Li[3], Feiyu Xiong[3], [1]New York University, New York, NY, [2]Hong Kong University of Science and Technology, Hong Kong, China; [3]Alibaba Group, Hangzhou, China.
Abstract: Voice-activated shopping devices (voice AI), such as Amazon's Alexa or Alibaba's Genie, as a new channel for shopping, are gaining popularity among consumers. It has become important, therefore, to understand how the adoption and usage voice-activated shopping affects consumers' purchase and search behavior, and which of consumers would purchase and search more (or less) as the result of adopting AI. We collaborate with Alibaba to take the first step toward filling this research. We leverage a natural experiment and a novel algorithm, instrumental forest, to the heterogeneous treatment effect of voice shopping. The results indicate that usage of voice-activated shopping leads consumers to purchase more quantities and more. There is substantial heterogeneity in the treatment effects. The positive on purchase quantity is more pronounced for high-income, younger, and more consumers. Voice AI does not cannibalize other channels; rather it boostspurchases through PC and mobile channels. Moreover, the adoption of voice-activated leads to more search in terms of both breadth and depth. We further explore that explain the changes. The findings provide useful implications for both -commerce companies and businesses that harness voice-activated shopping.

Presentation 3 **Asymmetric Consequences of Cybersecurity on Healthcare**
Yiting Deng[1], Anja Lambrecht[2], Catherine Tucker[3], [1]University College London, London, United Kingdom; [2]London Business School, London, United Kingdom; [3]MIT, Cambridge, MA
Abstract: Healthcare IT brings several benefits to both the healthcare industry and patients. However, at the same time, it can also lead to concerns on data breaches and potential discrimination based on health record. This paper explores the unintended consequence of cybersecurity on healthcare delivery. Specifically, we look at the effect of the WannaCry cyber attack which initiated on Friday, May 12, 2017, on the National Health Service (NHS) in the United Kingdom. We investigate how this cyber attack affected the outpatient appointments, inpatient admissions, and Accident and Emergency (A&E) attendances. Results indicate in general, trusts in less wealthy areas were more vulnerable to the cyber attack. Among trust that were infected by the cyber attack, those in less wealthy areas were more severely affected by experiencing a larger increase in outpatient appointment. In addition, uninfected trusts that are in lower income areas experienced an increase in wait time at the Accident and Emergency (A&E) department. Further, the rate of emergency department visits increases with deprivation, which implies that people in less wealthy areas suffer a disproportionate double whammy from the cyber attack: they suffer more from health issues and generally rely on A&E departments more compared with people in wealthier areas, and they had to wait longer in A&E departments after the cyber attack.

Presentation 4 **Apparent Algorithmic Discrimination and Algorithmic Learning**
Anja Lambrecht, London Business School, London, United Kingdom.
Abstract: The focus of the popular debate on algorithmic bias has been on algorithms that hard-code bias or the idea that algorithms can learn bias from the data that itself reflects bias. In this research, we show that demand can create apparent algorithmic bias, and we link apparent algorithmic bias to algorithmic learning. Specifically, we demonstrate in the context of search advertising that if consumer demand for a piece of information is low, an algorithm may take longer to learn about consumer preferences, leading to differential outcomes across those demographic groups whose characteristics are more common and those groups whose characteristics are less frequent in society. As a result, the algorithm may be likely to show a undesirable ad to a disadvantaged group for a longer period of time as it takes longer for the algorithm to learn about the lack of efficacy of the ad.

Presentation **Session Chair**
Anja Lambrecht, London Business School, London, United Kingdom.

Presentation **Session Co-Chair**
Catherine Tucker, MIT, Cambridge, MA

Session SA07 **Marketing and Welfare I**
07
9:00 AM - 10:00 AM

Presentation 1 **The Effects Of Sharing Economy Firms On Traditional Markets: A Study Of The Lodging Industry**
Yi-Lin Tsai[1], Chekitan S. Dev[2], Pradeep Chintagunta[3], [1]University of Delaware, Newark, DE, [2]Cornell University, Ithaca, NY, [3]University of Chicago, Chicago, IL, Contact: yilint@udel.edu
Abstract: Existing empirical studies on the impact of sharing economy firms in the lodging industry have generated mixed results: some studies show there is an impact while others show negligible or no impact. In this study, we investigate how short-term accommodation rental (STAR) firms (e.g., Airbnb and Homeaway) impact a traditional (or legacy) hotel market with the supply that is fixed in the short term and demand that is variable (or seasonal). We use the ordinance enacted in San Francisco effective February 2015 that lifted restrictions on short-term rentals as a natural experiment to conduct our analysis. Using panel data from 300 hotels, we quantify the impact of a change in STAR regulation on hotels in the city of San Francisco (95 hotels), and the spillover effect on hotels close to San Francisco (205 hotels), the first study of its kind to look at impact on both focal and proximate markets before and after an exogenous market shock. Our results show a negative impact on the revenue of hotels in San Francisco. The change in regulation also led to a decrease in revenue of hotels in nearby markets (e.g., Daly City) during the traditional high season or "compression" periods (i.e., when hotel occupancy rate is higher than 95%) but not during non-compression or low season periods. Interestingly, there is some heterogeneity in spillover effects in terms of stronger effects immediately after the change in regulation and weaker in the longer term and stronger spillover effects on hotels close to the city and weaker spillover effects on hotels away from the city. Our research contributes to the sharing economy literature by demonstrating this spillover effect and its nuanced effects by using a natural experiment and informs practitioners and policymakers by showing that sharing economy firms can lower cost in peak demand periods with the potential to increase consumer welfare.

Presentation 2 **Competition for Reputation**
Kalinda Ukanwa[1], David Godes[2], [1]University of Southern California, Los Angeles, CA, [2]University of Maryland, College Park, MD
Abstract: We investigate how competition for reputation among consumers can impact the effectiveness of firm interventions. In situations where the firm attempts to intervene to change consumer behavior (e.g., advertising, policy guidelines, legal threats), the consumer's response may depend not only on his own reputation-building considerations but also on his competition's. In this study's context, we model an uploader's decision to enhance his reputation by uploading pirated content on a digital platform. For his decision, he weighs the gains from uploading to build his reputation versus the costs from penalties associated with copyright lawsuits (firm interventions). Furthermore, intense competition from other uploaders who also seek to build their reputations impact potential gains. Our theory proposes that high-reputation uploaders decrease their reputation-building activity in response to the lawsuits. However, this decrease creates an opportunity for their low-reputation competition, who increase their uploading activity to enhance their reputations on the site. We use a dynamic hierarchical Bayesian Probit to model the uploader's daily decision to upload pirated content on a large piracy platform. We estimate our parameters using two datasets which span a four year period: 1) a panel dataset of the daily upload activity of 752 uploaders; and 2) a dataset of U.S. Federal copyright lawsuits associated with pirated online content. Our findings support our theory and suggest that copyright lawsuits may deter uploading in the short-run but may actually lead to more piracy over the long-run. Our study contributes to the reputation, incentive and piracy literatures in two ways: 1) by providing a novel theory proposing that under certain conditions, competitive dynamics can have a significant role in reputation-building behavior in marketplaces. It demonstrates that competitive reputation building between individuals can change the impact of incentives and subsequently produce behavior that is the opposite of what the incentives intended; 2) by providing empirical evidence of that there are competitive dynamics between individuals who are building their reputations. The implication for firms is that when considering consumer interventions, firms need to account for consumer reputation concerns and plan accordingly. Keywords: reputation, competition, firm interventions, negative incentives, deterrence

Presentation 3 **Culture, Competition And Product Positioning: Historical Evidence From U.s. Radio Stations**
Lena Song, New York University, New York, NY, Contact: lena.song@nyu.edu
Abstract: This paper examines the role racial discrimination, technical change and competition play in product choice of radio stations in the post-war Jim Crow era. I construct a novel, comprehensive dataset of all commercial radio stations across the U.S. from 1946 to 1958, including station-level financial information and black programming hours. This provides a new panel measure of racial diversity in the media across the country. By comparing profitability of black and other radio stations, I address the question whether racial discrimination by firms led to underprovision of content for minorities and whether it varied across the country and over time. Based on existing work on product differentiation, I build a theoretical framework to model programming choice in radio market under segregation to back out a measure of firm owner discrimination. Finally, I test if competitive pressure from the introduction of TV reduces this media market discrimination.

Presentation 4 **A War On Sugar? Finding The Sweet Spot In Sugar Reduction Strategies**
Kristopher Keller[1], Jonne Guyt[2], [1]Kenan-Flagler Business School, Chapel Hill, NC, [2]University of Amsterdam Business School, Amsterdam, Netherlands. Contact: kristopher_keller@kenan-flagler.unc.edu
Abstract: Consumers are increasingly aware of the need to maintain a healthy weight to prevent numerous diet-related diseases, such as obesity, diabetes, and heart conditions. Yet, consumers in both emerging and developed markets consume considerably more sugar than is recommended by the FDA, facilitating serious illnesses and increasing healthcare costs. Given the shift in consumers' attitude towards sugar, many consumer-packaged-goods manufacturers and retailers have increasingly been trying to contribute to solving this crisis without endangering sales. Effectively, brands have adjusted the sugar content in their product portfolio through two (non-exclusive) *sugar strategies*, by launching versions of their sugary products that (i) decrease the amount of sugar ("reduced sugar version"), and/or (ii) are smaller in package size, resulting in less total sugar intake ("smaller portion sizes"). While it is not trivial to select a fitting strategy, both are used in practice. Thus far, both practitioners and academics have yet to reach a consensus on the outcomes of these strategies. This study fills this gap by studying the implications of reducing a brand's relative sugar content and package size. From a *managerial* perspective, we focus on the

performance outcomes; what happens to a brand's sales level as a result of sugar strategies (RQ1)? From a *policy* perspective, we study how the effects of these strategies influence *sugar consumption* at market levels (RQ2). Finally, we identify when win-win scenarios are possible (RQ3), in which both managers and policymakers achieve a favorable outcome: a brand sales increase coupled with a sugar consumption reduction in the market across brands. To do so, we study the US' soda category from 2006-2016. We use proprietary data provided by the market leader in product content evaluation, and match elaborate nutritional content information with weekly store-scanner data. These datasets shed light on the effect of sugar strategies on brand performance and sugar consumption in the soda category across 850+ markets, covering all leading brands for 10+ years.

Presentation **Session Chair**
Kristopher Keller, Kenan-Flagler Business School, Chapel Hill, NC

Session SA08 **Modeling Firms Strategic Decisions with CRM data**
08
9:00 AM - 10:00 AM

Presentation 1 **The Impact of Subscription Programs on Customer Purchases**
Raghuram Iyengar[1], Young-Hoon Park[2], Qi Yu[1], [1]University of Pennsylvania, Philadelphia, PA, [2]Cornell University, Ithaca, NY
Abstract: Subscription programs are increasingly popular among a wide variety of retailers. These types of programs give members access to a set of exclusive benefits for a fixed fee upfront. In this paper, we examine the causal effect of adopting a subscription program on subsequent customer behavior using a unique panel data from a company that launched a subscription program. To account for self-selection and identify the individual-level treatment effects, we combine a difference-in-differences approach with a generalized random forest that matches each member of the program with comparable non-members. We find the subscription leads to a large increase in customer purchases. The effect is economically significant, persistent over time, and heterogeneous across customers. Interestingly, only one-third of the effect on customer purchases is due to the economic benefits of the subscription program and the remaining is attributed to becoming a member per se. We provide evidence that members experience a sunk cost fallacy due to the upfront payment that subscription programs entail. We discuss the implications of our findings for customer retention and subscription services.

Presentation 2 **Fewer Clicks, More Purchases**
Murat Unal, Young-Hoon Park, Cornell University, Ithaca, NY
Abstract: E-commerce retailers are increasingly faced with the challenge of finding ways to provide a seamless shopping experience to customers. The checkout process and its related touch points are especially critical in shaping the shopping experience of customers and thereby determining their behavior at an online store. In this paper, we examine how enrollment in an option that reduces the number of steps required to place a purchase order, referred to as one-click buying, affects subsequent customer behavior. Using quasi-experimental data over a period of 32 months from an online retailer before and after the launch of one-click buying, we find one-click buying is effective in lifting sales and does so by making treated customers purchase more often with more items per order. The impact of one-click buying on customer purchases is economically significant, persistent over time, and heterogeneous across customers. Analyzing clickstream data of customer activity online, we provide evidence that the increase in customer purchases is driven by both more visits to the website and more engaged searches upon visit. We discuss the implications for customer experience and targeting.

Presentation 3 **Grace Period Customer Retention Strategies**
Mahima Hada[1], Rajdeep Grewal[2], Karthik Sridhar[3], [1]University of North Carolina, New York, NY, [2]University of North Carolina, Chapel Hill, NC, [3]Baruch College - The City University of New York, New York, NY
Abstract: In contractual subscriptions services and products, such as online storage or magazines, customers often lapse in their subscription renewals. Grace periods emerge when subscriptions lapse, but a customer might keep receiving a magazine or newspaper (e.g., The Wall Street Journal), an accident is still covered under insurance (e.g., Geico), and content is still stored online (e.g., Microsoft One Drive). However, all these firms display significant heterogeneity in the grace period offers they make (in the offer duration and discount for that period) to increase the likelihood of customer renewal. Given the importance of grace period strategies for customer renewal of subscription services, the authors build a structural model with two strategic actors: the firm and a customer. The customer maximizes utility from renewal and grace period consumption, and the firm optimizes profits from renewal and grace period offers. Both actors interact by taking expectations on each other's potential actions based on incomplete information. With a rich dataset on over 12,00 customers receiving over 23,000 renewal offers over 3 years, the results show that while grace period offers are effective in increasing renewals, they also increase customer's likelihood of letting the subscription lapse in expectations of getting a grace period offer. With counterfactuals, we evaluate common grace period strategies that firms in the industry follow and their effects on customer renewals.

Presentation **Session Chair**
Mahima Hada, Baruch College, CUNY, New York, NY

Session SA09 **Digital Marketing Applications**
09
9:00 AM - 10:00 AM

Presentation 1 **Beyond The Search Bar: The Value Of Improving Search Quality On E-commerce Platforms**
Wei Zhou[1], Zidong Wang[2], [1]Eller College of Management, University of Arizona, Tucson, AZ, [2]Alibaba Group, Hangzhou, China.
Abstract: The innovation of search technology is at heart of e-commerce platforms' core business as to facilitate transactions between sellers and buyers. In collaboration with Alibaba, we take advantage of a quasi-experiment to investigate how an improvement in search targetability, or the quality of search, affects consumer online shopping experiences , search engine revenue, and market structure in online retail markets. The improvement was achieved by a change in search technology that increased the matching between consumers' shopping intents and relevant products in the search results. Using extremely detailed data on what consumers search for, what they are shown, and how they respond including, scrolling down, changing queries, clicking, and purchasing, we find four main results: (1) Consumers' click-through rates increase by 37.3% with the improvement in search quality, resulting in a 64.4% increase of gross merchandise volume. (2) This positive effect is disproportionate and more pronounced for consumers who search for niche products. (3) As search quality increases, consumers view fewer listings before making a purchase. This implies that rather than simply saving search costs, the improvement in search quality mainly increases consumer surplus by offering better matches (4) Markets become less concentrated with the improvement of search quality. Small sellers gain more market shares and are more likely to enter the market as the probability of matching increases. Overall, our findings suggest that online search technologies can not only reduce consumer search costs but also increase the match quality between consumers and products. This matching effect is more significant and crucial for niched products. In turn, the improvement of search quality decreases the concentration of sales and makes the market more competitive.

Presentation 2 **Streaming, Sales, And Satisfaction: Video Analytics In Investigating The Impact Of Live-stream Shopping On Product Return**
Shunyuan Zhang[1], **Kaiquan Xu**[2], Liquan Song[2], [1]Harvard Business School, Boston, MA, [2]Nanjing University, Nanjing, China. Contact: xukaiquan@nju.edu.cn
Abstract: Live-stream shopping (Live E-commerce) is seeing an explosive trend with a 70% year over year growth. It is believed to be a revolutionary marketing tool that provides interactive and immersive consumer shopping experience, which has for long been a critical challenge for online retailers. Companies utilize the seamless shopping experience of live streaming to boost sales. Yet, the attention has been largely limited to customers' pre-sales behavior, e.g., store visits and purchase intent. There is a lack of understanding of how live streaming would shape customer's after-sales journey and affect online retailer's future sales. Estimating a unique daily sales and live streaming data from a top online children's apparel retailer in China, we reported a positive impact of live streaming on product daily sales of 13.4%, verifying the power of live stream in improving consumers' pre-sales purchase intent. However, we found that live streaming, on average, increases the dollar values of returned order by 24.7%, suggesting a negative impact on online retailers' profit and customer's after-sales satisfaction. We explored the mechanism behind the documented effects and proposed that live streaming may encourage impulse buying behavior through its enabled real-time interaction and one-click purchase. Furthermore, we drew upon theories from behavioral research to define the underlying dimensions in the factors that play roles in influencing impulse buying decisions. Performing a large-scale video analytics, we identify and measure the key video features that would 1) improve customer engagement and purchase intention, and 2) evoke/reduce customer impulse buying. We discuss the implications of our findings and present descriptive recommendations in video optimizations for digital platforms to utilize live e-commerce.

Presentation 3 **Strategic Aspects Of Pay-what-you-want Pricing In The Context Of User Generated Content**
Jieun Lee, Debanjan Mitra, Joseph Pancras, University of Connecticut School of Business, Storrs, CT, Contact: j.lee@uconn.edu
Abstract: User generated content (UGC) has been an increasingly prevalent type of online content. Along with advertising and freemium business models, pay-what-you-want (PWYW) business model is one way to monetize user generated content. On UGC platforms, PWYW is feasible both from the demand side and from the supply side. That is, both content users and content creators can give tips (i.e., virtual money) to a content creator. Focusing on PWYW behavior on the supply side, which has not been largely explored, the authors examine how and why a content creator financially helps other content creators given competitive market. Using analytical and empirical analyses, we find that a content creator gives tips other creators, which benefits himself or herself in return - i.e., strategic motives of PWYW. In particular, a content creator with larger tip amount strategically gives tips to a content creator with smaller tip amount and more interestingly, a content creator with *smaller* tip amount strategically helps a content creator with *larger* tip amount. We also demonstrate that different objectives of a content creator, i.e., for profits vs. for non-profits, explain this heterophily in PWYW behavior. Theoretically, our research is the first attempt to tease apart the supply side from the demand side when it comes to identifying motives of PWYW behavior. Managerially, since PWYW involves real financial transactions, our research should be of great interest to UGC firms who share their revenues with their content creators.

Presentation 4 **Targeting In Batches**
Keyan Li[1], Duncan I. Simester[2], [1]MIT, Cambridge, MA, [2]MIT, Cambridge, MA, Contact: keyanli@mit.edu
Abstract: Once a firm has a targeting policy, collecting additional experimental data to improve that policy has an opportunity cost, and results in what is classically considered an exploration vs. exploitation trade-off. This tradeoff is widely studied in online learning domains. However, in many marketing channels, we are forced to learn in a batch environment, which creates new challenges. In this paper, we investigate how to optimally combine exploration (more experimentation) and exploitation (policy implementation) to improve a targeting policy. Our proposed algorithm balances the value and opportunity cost of new information. We also investigate whether customer responses to past implementations of a policy can be used to train a new policy. We validate our findings using data from a field experiment.

Presentation **Session Chair**
Keyan Li, MIT, Cambridge, MA

Saturday, June 13, 2020
Session "SB"
10:15 AM - 11:15 AM

SB01. Bayesian Perspectives on Applied Machine Learning

SB02. Wisdom from Words: Insights from Natural Language Processing

SB03. Game Theory: Applications II

SB04. Pricing II

SB05. Reviews I

SB06. Adoption of Algorithms by Firms and Algorithmic Biases

SB07. Empirical Policy Research 1

SB08. Customer Lifetime Value

SB09. Promotions - Field Experiments

SB10. Marketing Strategy and Management I

Session SB01 **Bayesian Perspectives on Applied Machine Learning 01**
10:15 AM - 11:15 AM

Presentation 1 **Privacy Preserving Data Fusion**
Longxiu Tian[1], Dana Turjeman[2], [1]University of North Carolina, North Carolina, NC, [2]University of Michigan, Ann Arbor, MI
Abstract: We introduce a scalable privacy preserving method for data fusion. Data fusion - combination of multiple datasets - is a powerful technique to make inferences that are more accurate, generalizable, and useful than those made with any single dataset alone. However, anytime data fusion involves any form of user-level data, the technique poses a privacy hazard. We obtained novel data on responses to an anonymous user survey from an affair-seeking website, along with detailed behavioral data on approximately one-million of its users, in which we discovered that users' identities might effectively be uncovered. With this pressing need, we developed Privacy Preserving Data Fusion (PPDF) with the goal of preserving user anonymity while enabling the full suite of customer analytics allowed for by extant data fusion techniques. This framework consists of a set of variational autoencoders with bidirectional transfer learning. Our framework does not require that the same users appear in both datasets to make inferences on the joint data. Moreover, PPDF is model-agnostic in that it allows for inferences to be made on the fused data, without needing to specify the model/analysis a priori to fusion. Most importantly, it does so without the original datasets ever coming in contact on a single machine or within a model, thereby eliminating the risk of compromising users' privacy and anonymity.

Presentation 2 **A Nonparametric Approach To Playlist Curation And Personalization**
Khaled Boughanmi[1], Yang Li[2], Asim Ansari[3], [1]Cornell University, Ithaca, NY, [2]Cheung Kong Graduate School of Business, Beijing, China; [3]Columbia University, New York, NY, Contact: kb746@cornell.edu
Abstract: Playlists have undoubtedly 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 10,000 playlists that are carefully curated for a variety of musical tastes and consumption contexts, and are followed by millions of online listeners. 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 nonparametric approach to perform these tasks. We identify the musical preferences of online users for diverse musical styles and listening contexts in an unsupervised fashion. In particular, we assume that each playlist consists of a mixture of musical themes and contextual moods, where each mood and theme is a probability distribution over songs. We use Hierarchical Dirichlet process (HDP) priors to nonparametrically detect and estimate these thematic probability densities. 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.

Presentation 3 **Nonparametric Deconvolution Models**
Allison Chaney[1], Archit Verma[2], Young-suk Lee[3], Barbara Engelhardt[2], [1]Duke University, Durham, NC, [2]Princeton University, Princeton, NJ, [3]Seoul National University, Seoul, Korea, Republic of.
Abstract: We describe *nonparametric deconvolution models* (NDMs), a family of Bayesian nonparametric models for collections of data in which each observation is the average over the features from heterogeneous individuals. For example, these types of data are found in elections, where we observe precinct-level vote tallies (observations) of individual citizens' votes across each of the candidates or ballot measures (features), where each voter is part of a specific voter cohort or demographic (factor). Like the hierarchical Dirichlet process, NDMs rely on two tiers of Dirichlet processes to explain the data with an unknown number of latent factors; each observation is modeled as a weighted average of these latent factors. Unlike existing models, NDMs recover how factor distributions vary locally for each observation. This uniquely allows NDMs both to deconvolve each observation into its constituent factors, and also to describe how the factor distributions specific to each observation vary across observations and deviate from the corresponding global factors. We present variational inference techniques for this family of models and study its performance on simulated data and voting data from California.We show that including local factors improves estimates of global factors and provides a novel scaffold for exploring aggregated behavioral data.

Presentation 4 **Detecting Routines In Ride-sharing: Implications For Customer Management**
Ryan Dew[1], Eva Ascarza[2], Oded Netzer[3], Nachum Sicherman[3], [1]University of Pennsylvania, Philadelphia, PA, [2]Harvard Business School, Boston, MA, [3]Columbia University, New York, NY
Abstract: Routines are common across many industries, including ride-sharing, where consumers may use the same app to take the same trips on a regular basis. Yet, while routines, habit formation, and their implications have been studied in the lab, little work has been done on understanding the implications of routines in the field. Partly, this lack of research stems from the statistical problem of estimating routine usage. In this study, we propose a new approach to measuring routines in the context of ride-sharing. Specifically, we model usage of the platform as an individual-level inhomogeneous Poisson point process, where the rate of usage is determined partly by a Bayesian nonparametric Gaussian process. Crucially, in estimating this rate function, we leverage a unique cyclical kernel structure, that allows for precise estimation of recurrent behavior. We then use this model as a basis for understanding the implications of routines for customer management, with a focus on understanding how routine usage affects customer value and churn, and the service-related drivers of routine formation.

Presentation **Session Chair**
Ryan Dew, University of Pennsylvania, Philadelphia, PA

Session SB02 **Wisdom from Words: Insights from Natural Language Processing**
02
10:15 AM - 11:15 AM

Presentation 1 **Quantifying The Shape Of Narratives**
Olivier Toubia, Columbia Business School, New York, NY
Abstract: Across cultures, narratives are a powerful vehicle for everything from informing and entertaining to maintaining the social order. But while everyday language often describes narratives as having shapes (e.g., moving in circles or pushing the envelope), and researchers have theorized about them, little work has actually quantified narrative trajectories or examined how such features might be linked to success. To fill this gap, we use several state-of-the-art techniques from natural language processing and machine learning to represent narratives as sequences of points in a latent, high-dimensional space. We construct a simple set of measures, apply them to thousands of narratives from a variety of domains (i.e., movies, TV shows, and academic papers), and examine if and how they are linked to success (e.g., the number of citations a paper receives). Our results highlight some important cross-domain differences and provide a general framework that can be applied to study all types of narratives.

Presentation 2 **Disinformation Through Hype: The Oz Effect In Healthcare**
Zijun Shi[1], Xiao Liu[2], **Kannan Srinivasan**[3], [1]HKUST, Hong Kong, China; [2]New York University, New York, NY, [3]Carnegie Mellon University, Pittsburgh, PA
Abstract: Consumers' healthcare choices are heavily influenced by public information, such as news, research articles, product reviews, and TV shows. Dr. Oz, a celebrity doctor, has made medical recommendations that have limited or marginal scientific evidence. Although reputable media traditionally act as "gatekeepers" to reliable information, they face the intense pressure of eyeball game. Product reviews, despite their authenticity, may come from deceived consumers. Therefore, whether public information sources could correct misleading health information or not remains unknown. In the context of over-the-counter weight loss products, we carefully investigate information cascade post endorsement. By analyzing extensive textual content using deep-learning, we find that legitimate news outlets respond to *The Dr. Oz Show* by generating more news articles. Surprisingly, they do so with a higher sentiment, and end up amplifying the endorsement. The result highlights a severe concern: there is a serious risk of disinformation through hype. Research articles react too slowly to mitigate the problem, and consumer reviews provide only marginal correction. Our findings underscore the importance of oversight given the risk of cascading disinformation.

Presentation 3 **GDPR And Consumer Search**
Yu Zhao[1], Pinar Yildirim[2], [1]University of Pennsylvania, Philadelphia, PA, [2]University of Pennsylvania, Philadelphia, PA
Abstract: In this study, we estimate the impact of General Data Protection Regulation (GDPR) introduced in the European Union in 2018 on consumer search. Using data from several million consumers located in four countries, we estimate the impact of online sites' privacy policy changes on frictions that consumers face while shopping for products. We focus on several aspects of search: (1) topics of search inferred from individuals' keywords, browsing pattern, and other available information about the consumer, (2) frequency and duration of search. We use a combination of topical and behavioral modeling methods to characterize search and investigate how search characteristics change before and after policy change. Our study shows that informational frictions introduced by privacy policy changes due to GDPR impact search outcomes.

Presentation 4 **Quantifying Cultural Change: An Application to Misogyny in Music**
Reihane Boghrati, Wharton, Seattle, WA
Abstract: Consumer researchers have longs been interested in culture and cultural change, but measurement has proved challenging. It is difficult to acquire data over time, and some things, particularly the relationship between concepts (e.g., brand personality or cultural stereotypes) are difficult to measure. This paper suggests that an emerging computational linguistics method, word embeddings, can help address some of these challenges. In particular, we demonstrate how this approach can be used to address a longstanding question, whether music lyrics are misogynist (i.e., exhibit a dislike of, contempt for, or ingrained prejudice against women). Natural language processing of a quarter of a million songs over 50 years provides an empirical test of whether music is biased against women and how these biases have changed over time. While both genders are equally likely to be objects of aggression, subtler machine learning approaches paint a more complex picture. Compared to men, women are less likely to be associated with desirable traits (i.e., competence). While this bias has decreased, it persists. Ancillary analyses suggest that lyrics have become less gendered more broadly (though remain gendered) and that temporal changes may be driven by male artists' (as female artists were less biased initially). Overall, the results shed light on subtle measures of bias and how natural language processing can provide deeper insight into cultural change.

Presentation **Session Chair**
Jonah Berger, University of PA- Wharton, Philadelphia, PA

Presentation **Session Chair**
Reihane Boghrati, Wharton, Seattle, WA

Session SB03 **Game Theory: Applications II**
03
11:30 AM - 12:30 PM

Presentation 1 **How Does Competition Affect Exploration Vs. Exploitation In Strategic Recommendations?**
H. Henry Cao[1], Liye Ma[2], **Z. Eddie Ning**[3], Baohong Sun[4], [1]Cheung Kong Graduate School of Business, Beijing, China; [2]University of Maryland, College Park, MD, [3]Cheung Kong Graduate School of Business, Beijing, China; [4]Cheung Kong Graduate School of Business, New York, NY, Contact: zhaoning@ckgsb.edu.cn
Abstract: Marketing is becoming increasingly interactive and media rich. Through repeated interactions, firms refine their understanding of consumers' preferences for personalized targeting and recommendation. Strategic proactive learning of consumers, e.g., through adopting reinforcement learning, can further improve firms' performance. However, despite the heightened interest and rapid evolution in practices, an in-depth understanding of the theoretical implications is still lacking. Many questions remain open: What is the optimal recommendation strategy that balances exploration and exploitation? To what source should the value of learning be attributed, and what factors affect this value? How does competition affect firms' learning strategies, and who benefits from firms' ability to learn? In this study, we answer these critical questions analytically. Using a continuous-time bandit model to analyze firms that supply content to consumers, a key market as well as a representative setting for learning consumer preferences, we show how a forward-looking recommendation strategy, which balances the trade-off between exploration and exploitation, differs from a myopic strategy that only maximizes the current quality of recommendation. Somewhat surprisingly, we show that for a monopoly, the entire value of learning can be attributed to the forward-looking component, while the myopic strategy does not provide any value. More importantly, our analysis shows that competition discourages proactive learning. In a duopoly where firms compete for consumers' attention, firms focus more on exploitation than exploration in their recommendations. The level of proactiveness crucially depends on the extent of consumer impatience. In the extreme case with myopic consumers, firms act completely myopic. We are the first one to examine the equilibrium of this multi-agent bandit problem, and our results provide important implications on internet firms' adoption of AI strategy as well as policies concerning firms' ability to continuously learn and customize to individual consumers.

Presentation 2 **Seller-initiated Consumer Financing, Default Risks And Distribution Channels**
Chenchen Di[1], Yunchuan Liu[2], [1]UIUC, Champaign, IL, [2]University of Illinois, Champaign, IL, Contact: cdi2@illinois.edu
Abstract: Seller-initiated consumer financing is a prevalent yet understudied phenomenon in marketing, especially in a distribution channel where a supplier offers trade credits to a retailer for selling the supplier's products and the retailer offers credits to consumers. In this paper, we study why firms offer consumer financing and how firms make strategic decisions both financially and operationally with consumers' default risks and the retailer's bankruptcy risk.

Presentation 3 **Two Experts Are Better Than One: Reaping The Rewards Of Specialization Through Better Communication Of Knowledge**
Jinzhao Du[1], Kevin Du[2], [1]The University of Hong Kong, Hong Kong, Hong Kong; [2]University of Southern Denmark, DK-5230 Odense M, Denmark.
Abstract: The successful management of firm knowledge ensures that useful consumer knowledge is communicated effectively to inform product design decisions. This study analyzes how the use of a common organizational language can enhance communication between a marketing analyst and a product engineer. The use of a common language is shown to increase the probability of knowledge transfer; however, its dependence on learning effort from both parties makes it beneficial only when the cost of learning is not too high and each party can capture an adequate share of the firm's value. Distortions arise when the engineer, initially uncertain about the demand for its own product design, must determine the mode of communication with the marketing analyst to obtain information on consumer preferences. If the engineer is given the power to choose whether to implement a common language system and how much equity to allocate to the marketing analyst, the common language will be both under-used and under-exploited when it is adopted. The deviation of the engineer's actions from the firm optimal decision has managerial implications for the role of intermediation to resolve communication issues between disparate parties within an organization.

Presentation 4 **Crowding Out And Over-Provision Of Corporate Social Responsibility**
Sumitro Banerjee[1], Luc Wathieu[2], [1]Grenoble Ecole de Management, Grenoble, France; [2]Georgetown University McDonough School of Business, Georgetown, DC, Contact: sumitro.banerjee@grenoble-em.com
Abstract: Corporate social responsibility (CSR) has been gaining popularity as an increasing number of consumers pay attention and experience a "warm glow" from purchasing goods and services from firms that engage in CSR. The warm glow allows firms to charge a premium on their sales and help recover their investment in CSR. We examine whether the public good provided by CSR, when publicly provided by governments can increase the social welfare. Comparing the optimal provision of CSR by a firm with a market where the public good is provided by a social planner and private good (the product) is provided by a firm, we show that while the firm is better off jointly providing both the private and the public good (CSR), the social welfare is higher when the public provision of the public good crowds out the CSR if the efficiency of the public provision is above a threshold that decreases as the marginal cost of production of the private good sold by the firm or the importance of the public good increases. Such a possibility leads to a "over-provision" of CSR especially by firms having a higher marginal cost of production of the private good. In a competitive market with two firms vertically differentiated on product quality, a high quality firm is pressured to "over-provide" CSR not only by the low quality firm, but also the possibility of crowding out by government. The analysis lends itself to implications for both policy and managerial decisions.

Presentation **Session Chair**
Sumitro Banerjee, Grenoble Ecole de Management, Grenoble, France.

Session SB04 **Pricing II**
04
10:15 AM - 11:15 AM

Presentation 1 **A Semiparametric Approach To Orthogonal Random Forest: Estimating Heterogeneous Price Elasticities Of Demand For Knowledge Goods In Peer-to-peer Markets**
Jia Liu, **Ziwei Cong**, HKUST, Hong Kong, China. Contact: zcongaa@connect.ust.hk
Abstract: This paper generalizes Orthogonal Random Forest, a flexible nonparametric method for estimating heterogeneous treatment effects in the presence of high-dimensional confounders, by enabling semiparametric Deep Neural Networks (DNN) in estimating nuisance functions (i.e., functions of all confounding variables). Our proposed framework is appealing for real-world settings, where treatment policy is confounded with many observable factors in complex but partially known ways. For example, for panel data analysis commonly involved in economics and marketing problems (e.g., pricing, targeting advertising, customized recommendations), semiparametric DNN can capture cluster effects via "fixed effect" while accommodating nonparametric estimates for the rest of covariates. We apply this framework to estimate heterogeneous price elasticities of demand for knowledge goods in a Peer-to-Peer market where individual sellers have to set prices for their online pay-to-listen talks. We report how price elasticity varies across the characteristics of sellers (e.g., reputation and profile information), goods (e.g., topic category and product life cycle), and time (e.g., seasonality).

Presentation 2 **Information, Managerial Incentives, And Scale: Evidence From Hotel Pricing**
Matthew J. Leisten, Northwestern University, Evanston, IL, Contact: matthewleisten2014@u.northwestern.edu
Abstract: I study why some firms have better information about market demand than their rivals, with application to the hotel industry. Hotel chains delegate pricing to their franchisees and extract royalty payments as a percentage of revenues; larger chains charge higher royalties. Franchisees affiliated with larger hotel chains may have better information about demand because larger chains have more data, or they may have worse information because higher royalties weaken franchisee incentives to gather information. I develop a novel method to infer the quality of firms' information from price and quantity data by using common-knowledge demand shocks. I use this method to show that hotels affiliated with large chains have worse information than hotels affiliated with smaller chains. In a counterfactual setting in which royalties are fixed across chains, large chains become better-informed than small chains, suggesting that franchisee effort in gathering information is an important driver of information quality.

Presentation 3 **Advertised Reference Prices And Deal Attitudes - A Natural Experiment**
Nino Hardt, Ohio State University, Columbus, OH, Contact: hardt.8@osu.edu
Abstract: Online deal sharing communities, such as `slickdeals' with 11 million monthly users, allow users to share, search and rate `deals'. Deal descriptions can include product characteristics, deal instructions, the actual deal price and advertised reference prices (ARP). Understanding what improves attitudes towards deals is vital for manufacturers and retailers planning to employ price promotions. In particular, the use of ARPs is common in the marketplace.
Previous research has shown that the presence of ARPs results in more favorable attitudes towards offers. Higher ARPs have been linked to more favorable deal evaluations and higher purchase intentions.
However, extant research is almost entirely based on lab experiments.
In contrast, this paper is based on crowdsourced data from a deal community. Variation in deal description characteristics, including reference price information, for products that appear repeatedly in the deal community enable a natural experiment and DID-analysis.
We find that the mere presence of ARPs results in more visits and ratings of deals. Adding ARPs increases the share of favorable ratings and decreases the share of negative ratings. We compare results by product category and illustrate other determinants of popular deals, including characteristics of the deal title and the level of detail of the deal description. We discuss theoretical implications for consumer response to ARPs.

Presentation 4 **Brand Choice Under Price Confusion**
Sridhar Moorthy, Tanjim Hossain, Kailuo Liu, University of Toronto, Toronto, ON, Canada. Contact: sridhar.moorthy@rotman.utoronto.ca
Abstract: We examine brand choice under price confusion by manipulating price clarity. When price comparisons are difficult, demand functions are less elastic. Furthermore, the demand function shifts out in favor of the favored brand. The evidence suggests that three effects of price confusion drive our results.

Presentation **Session Chair**
Sridhar Moorthy, University of Toronto, Toronto, ON, Canada.

Session SB05 **Reviews I**
05
10:15 AM - 11:15 AM

Presentation 1 **Can Reviews Help Consumers Get A Better Deal? Understanding The Dual Impact Of Reviews On Consumer Product Choice**
Jisu Cao[1], Sha Yang[2], [1]University of Southern California, Alhambra, CA, [2]University of Southern California, Los Angeles, CA, Contact: caojisu0319@gmail.com
Abstract: The objective of this paper is to understand the impact of reviews on consumer demand for durable goods when consumers can negotiate a purchase price. Although prior literature has analyzed the impact of reviews on consumer baseline preference, none has explored such an impact on demand when the purchase price is negotiated. Leveraging a unique dataset on consumers' automobile purchases and transaction prices, our paper shows a double-edged sword effect of reviews on demand in such a setting. On the one hand, good reviews increase demand by raising consumer baseline preference; on the other hand, good reviews increase seller's bargaining power, and this increased seller's bargaining power along with the increased consumer baseline preference leads to a higher purchase price which hurts demand. We develop a structural model to uncover the multiple roles reviews have on demand through baseline preference, bargaining power, and negotiated price. Ignoring the impact of reviews on the negotiated price leads to a biased estimation of the effectiveness of reviews. In counterfactuals, we quantify the economic value of review features and provide profit implications of reviews for sellers.

Presentation 2 **Interacting User Generated Content Technologies - How Questions And Answers Affect Consumer Reviews**
Shrabastee Banerjee[1], Chrysanthos Dellarocas[2], Georgios Zervas[3], [1]Dept of Marketing, Boston University, Boston, MA, [2]Dept. of Information Systems, Boston University, Boston, MA, [3]Dept. of Marketing, Boston University, Boston, MA, Contact: sban@bu.edu
Abstract: We study the question and answer (Q&A) technology of electronic commerce platforms, an increasingly common form of user-generated content that allows consumers to publicly ask product-specific questions and receive responses, either from the platform or from other customers. Using data from a major online retailer, we show that Q&As complement consumer ratings and reviews: unlike reviews, questions are primarily asked pre-purchase, focus on clarification of product attributes rather than discussion of quality, and convey fit-specific information in a predominantly sentiment-free way. Based on these observations, we hypothesize that Q&As mitigate product fit uncertainty, leading to better matches between products and consumers, and therefore improved product ratings. We find that when products suffering from fit uncertainty start receiving Q&As, their subsequent ratings improve by approximately 0.1 to 0.5 stars and the fraction of negative reviews that discuss fit-related issues declines. The extent of the rating increase due to Q&As is moderated by the degree of ex-ante fit uncertainty. Our findings suggest that, by resolving product fit uncertainty in an e-commerce setting, the addition of Q&As can be a viable way for retailers to improve ratings of products that have incurred low ratings due to customer-product fit mismatch. In ongoing work, we are testing the limits of the effect we find, and how it evolves when the domain changes (e.g when product quality and Q&As are both less objective, such as for books and movies).

Presentation 3 **Do Online Ratings Accurately Reflect Quality? Price And Reported Quality In Yelp Reviews**
Sajeev Nair[1], Gerard J. Tellis[2], Sivaramakrishnan Siddarth[2], [1]University of Southern California, Los Angeles, CA, [2]University of Southern California, Los Angeles, CA, Contact: svijayak@marshall.usc.edu
Abstract: Online review platforms like Yelp, TripAdvisor, Expedia, etc. are now a major source of product quality information for some consumers. Extant academic literature seems to take the view that the average star rating is a proxy for product quality. In this study, we aim to show how online reviews may be systematically biased by some consumers who are unfamiliar with a product or service. We use review data from Yelp for over 2000 restaurants across two cities in the US for our study. We use a difference-in-differences approach to demonstrate how quality reported in online reviews are influenced by reviewers' familiarity with the product. We also use text analysis to show how reviewers' familiarity affects the product quality reported in online reviews. As a result, online ratings in review platforms may be biased.
Our study makes two key contributions. First, contrary to the established notion that high prices signal high quality, this research aims to show that high prices can elicit low quality ratings from some consumers. Second, while previous studies have highlighted factors like self-selection, social influence, and fake reviews that lead to biased quality inferences, to our knowledge the role of consumers' familiarity with a product or service in review bias has not been previously studied. Our study has two significant implications. First, review platforms should address the bias that we highlight by providing separate average ratings by reviewers' familiarity. Second, businesses listed on review platforms should consider reviewers' familiarity before responding to online reviews.

Presentation 4 **Nonlinear Estimation And Visualization With A Neural Network In Online Review Analysis**
Toshikuni Sato, Tohoku University, Sendai, Japan.
Abstract: This study discusses interpretable neural networks for marketing and consumer behavior research using customer reviews instead of measurement scales to obtain a better understanding of the customer experience. Because neural networks help estimate nonlinear measurement models with high dimensional data, we investigate some useful neural-network approaches to specify the network connections based on prior knowledge or theories in consumer behavior research. Estimating partial dependence functions and marginal effects, the empirical results provide insights into nonlinear mechanism linking customer experience and attribute performance with overall ratings.

Presentation **Session Chair**
Toshikuni Sato, Informs Account, Sendai, Japan.

Session SB06 **Adoption of Algorithms by Firms and Algorithmic Biases**
06
10:15 AM - 11:15 AM

Presentation 1 **When Algorithms Promote Inequality: A Structural Analysis of the Impact of Zillow's Zestimate on Housing Market**
Runshan Fu[1], Yan Huang[2], Param Vir Singh[3], Kannan Srinivasan[3], [1]Pittsburgh, PA, [2]American Express, New Jersery City, NJ, [3]Carnegie Mellon University, Pittsburgh, PA
Abstract: We study the impact of Zillow's Zestimate on the housing market. Zestimate is produced by a machine learning algorithm and is the best prediction of a home's value at any time. Zestimate is viewed to increase liquidity in the housing market as identifying the value of a home is a non trivial task. However, using data on Zestimate and Housing Sales in United States, we show that Zestimate may promote inequality. Zestimate requires a large amount of feature data on a home to be accurate. Using data listed on Zillow, we find that while most properties in richer neighborhoods have reported this data, a significant amount of data features are missing for properties in poorer neighborhoods. As a result, Zestimate is fairly accurate in richer neighborhoods. In contrast, in the poorer neighborhoods, Zestimate is inaccurate. The inaccuracy negatively affects the poorer neighborhoods. Properties which are undervalued by Zestimate become less likely to be sold and as a result less likely to enter the market. Whereas, properties which are overvalued by Zestimate are more likely to enter the market and typically sell at a price lower than the Zestimate. Overall, Zestimate promotes inequality by pushing a large number of properties in the poorer neighborhoods out of the market.

Presentation 2 **For-Profit Colleges and the Potential for Algorithmic Learning in Targeting Advertising**
Avi Goldfarb[1], Catherine Tucker[2], Avinash Collis[3], [1]University of Toronto, Toronto, ON, Canada; [2]MIT, Cambridge, MA, [3]Massachusetts Institute of Technology, Cambridge, MA
Abstract: For-Profit Colleges are often linked to harmful levels of unrepayable student debt. They have also been accused of using advertising to encourage students to enroll by using misleading messaging. In this paper we study the extent to which the current digital environment which focuses on the use of algorithms to place and evaluate ads contributes to this phenomenon. We test a variety of ad messages, that are commonly linked with for-profit colleges and show that the algorithm learns to show these messages in poorer. We show some evidence that suggests this is a result of the algorithm learning that these messages resonate better in poorer areas than richer areas.

Presentation 3 **Algorithmic Transparency**
Qiaochu Wang[1], Yan Huang[2], Stefanus Jasin[3], Param Vir Singh[4], [1]Pittsburgh, PA, [2]American Express, New Jersery City, NJ, [3]University of Michigan, Ann Arbor, MI, [4]Carnegie Mellon University, Pittsburgh, PA
Abstract: Machine Learning (ML) algorithms are being used throughout our economy in decision-making processes that have far-reaching impacts on employment, education, access to credit, etc. There are increasing concerns that algorithms make these processes more opaque and less accountable, which increases the risk of secret profiling and discrimination. Despite calls for algorithmic transparency, most firms have kept their algorithms opaque citing potential gaming by users when an algorithm is made transparent that may negatively affect the algorithm's predictive power and the firm's welfare. We develop an analytical model to investigate the issue of algorithmic transparency in the presence of strategic users from a firm's perspective and present novel insights. Counter-intuitively, we show that the predictive power of an algorithm may increase when the firm makes it transparent. We identify a broad set of conditions under which making the algorithm transparent benefits the firm by increasing the algorithm's accuracy and/or incentivizing users to improve their performance. The results hold even when the predictive power of the algorithm comes mainly from features that are costless to improve.

Presentation **Session Chair**
Param Vir Singh, Carnegie Mellon University, Pittsburgh, PA

Session SB07 **Empirical Policy Research 1**
07
10:15 AM - 11:15 AM

Presentation 2 **Industry-funded Research and Bias in Food Science**
Anita Rao, Chicago Booth, Chicago, IL
Abstract: Is industry-funded scientific research likely to be biased towards finding positive results? Using publication-level data consisting of abstract, citation counts and funding sources, I explore this question across various food groups. I evaluate each article's abstract using crowd-sourcing and machine-learning tools. I also collect each article's media mentions. I first conduct a case study on oats, where I find industry-funded research is 16% more likely to be positive compared to non-industry funded research. Moreover, industry-funded research although less cited by other researchers, is more likely to receive a media mention, suggesting such research might play a non-trivial role in forming consumers' opinion on what is healthy.

Presentation 3 **Persuasive Language: Evidence from Airbnb**
Michael Thomas, Santa Clara University, Santa Clara, CA
Abstract: We test consumers' response to the language used in product descriptions (e.g., classes of words, punctuation and text icons) using modifications to Airbnb product descriptions generated by property owners over time. Our analysis relies on tests of language's impact on the hazard that Airbnb bookings are acquired. We find evidence that consumers respond to some language features, though only some responses are consistent with a rational search process.

Presentation 4 **Comparing Firearm Proxies to Legal Firearm Prevalence in Massachusetts**
Jessica J. Kim, Kenneth C. Wilbur, University of California San Diego, La Jolla, CA, Contact: Jessica.Kim@rady.ucsd.edu
Abstract: Measures of firearm prevalence are necessary to understand how firearm availability correlates with health and crime data, but no direct national measures are available. Hundreds of published papers have used proxies for firearm prevalence. Proxy validity was established by comparing firearm proxies to surveys of firearm prevalence. We compare firearm proxies to population-level measures of firearm license data in Massachusetts, using an 8-year county/month dataset of all persons legally licensed to own firearms.

Presentation **Session Co-Chair**
Kenneth Wilbur, San Diego, CA

Session SB08 **Customer Lifetime Value**
08
10:15 AM - 11:15 AM

Presentation 1 **Product Customization And Customer Relationship Dynamics: The Effects Of Product Customization On Customer Loyalty And Value In Upscale Fashion Retailing**
Suh Yeon Kim[1], Mike Lewis[2], Tongil Kim[3], [1]Georgetown University, Washington, DC, [2]Emory University, Atlanta, GA, [3]The University of Texas, Dallas, TX
Abstract: Despite the growing prevalence of product customization capabilities such as “made-to-measure” clothing, empirical research that quantifies the relationship between customer relationship dynamics and product customization is limited. Product customization may potentially increase customers’ preference, switching costs, willingness to pay, and cognitive lock-in. However, there are also potential downsides to customization. Customization options may induce choice overload, create uncertainty about the final product, and impose incremental money and time costs on the consumer. In this study, we investigate the relationship between customization and customer metrics, such as retention and customer lifetime value. First, we investigate how product customization choices heterogeneously effect short- and long-term customer profitability. Second, we examine how different levels of customization (e.g., alterations, monogramming, made-to-measure, or bespoke) affect future customer behaviors and lifetime values differently. Third, we study whether customization options differentially impact private labels and national brands. Our empirical analyses utilize product customization data from an upscale clothing retailer. The analyses use a combination of causal inference identification strategies and machine learning techniques. We find that customers who purchase customized “made-to-measure” items are worth significantly more on average in the year following purchase compared to those who do not customize. In terms of branding effects, customization of the retailer’s private label products leads to three times more spending on the retailer’s house brands than on national brands.

Presentation 2 **Do High-value Customers Recruit New High-value Customers? Impact Of Customer Characteristics And Social Matching On Referral Program Effectiveness**
Harim Shin[1], Eunkyu Lee[2], Minjung Kwon[2], Guiyang Xiong[2], [1]Syracuse University, Syracuse, NY, [2]Syracuse University, Syracuse, NY, Contact: hshin09@syr.edu
Abstract: This paper analyzes the behaviors of existing and newly recruited customers in a customer referral program to gain a deeper understanding of the impact of customer characteristics, referral program designs, and social matching on customer behaviors and the resultant effectiveness of referral programs. We use a large-scale customer panel data supplied by a Korean mobile application service firm that operates as a transactional and logistical intermediary between individual customers and laundry service providers. The firm made major changes to the design of the referral program during the data collection period, which allows us to benefit from this natural experiment by comparing customers’ referral and transaction behaviors before and after the policy change. Furthermore, we perform detailed analyses of how the individual customer characteristics and the matching qualities between the giver and the receiver of a referral interact with the referral program design to affect the giver’s referral behavior and the key elements of the receiver’s customer lifetime value (CLV), which enables us to assess the overall profitability of each referral program and to make strategic recommendations for effective referral program design.

Presentation 3 **Relating Mobile App Usage To Customer Lifetime Value (clv): A New Machine Learning Approach To Predict Clv And Segment Customers**
taotao ye[1], Venkatesh Shankar[2], [1]Texas A&M University, college station, TX, [2]Texas A&M University, College Station, TX, Contact: tye@mays.tamu.edu
Abstract: Mobile apps dominate shoppers’ mobile usage and have become the gateway to shopping for many shoppers. Research on mobile apps show that the adoption and use of a branded retailer app increases purchases from the retailer across channels. The customer relationship management (CRM) literature offers a number of models to predict customer lifetime value (CLV) based on customer demographics and past purchase behavior. However, not much is known about the relationship between mobile app usage and CLV. In particular, there is a paucity of research on the heterogeneity in CLV based on mobile app usage. For example, some customers of a firm may engage more with banner ads and product reviews than others. Other customers may use more functional mobile app features such as product checkout and loyalty. It is unclear which of these customer types are more valuable to the firm. We plug this research void by addressing two key questions. What is the relationship between mobile app use and CLV? What aspects of mobile app use critically predict CLV? How can customers be segmented based on differences in mobile app use and its linkage with CLV? We address these questions by proposing and using a new machine learning approach on a carefully compiled unique dataset from a large retailer with several millions of customers who purchase from multiple channels. The approach combines topic model, hidden Markov model, and other supervised learning models. We train our proposed model on a large dataset and compare its performance with alternative benchmark models on test data. Our results provide several interesting and counterintuitive insights. In addition to answering the key research questions, our results offer new implications for managers for leveraging mobile app use data to more effectively manage customer relationships.

Presentation 4 **Attribution Of Advertisement Campaigns On Short-term And Long-term Consumer Behavior**
Saman Modiri[1], Scott A. Fay[2], Amiya K. Basu[2], [1]Syracuse University, Syracuse, NY, [2]Syracuse University, Syracuse, NY, Contact: smodiri@syr.edu
Abstract: There is a longstanding and extensive literature that examines the effectiveness and return on investment of advertising. However, many previous studies are limited to examining consumer response to very recent or current advertising campaigns. In practice, consumers are targeted and influenced by numerous campaigns delivered across multiple channels and in a longitudinal setting. Furthermore, advertisers aspire for their campaigns to influence not only the immediate response of consumers but also their long-term behavior. In this study, we aim to provide an examination that more closely reflects the complexities and interrelationships of advertising campaigns that exist in actual market environments. Specifically, we model the attribution of current and previous campaigns across different channels to the customers’

short-term and long-term purchase behavior. Our ad-stock variables capture the attribution of current and past advertisement campaigns. Furthermore, we connect these variables to the conversion probability (i.e., short-term response) and customer lifetime value (i.e., long-term behavior). We use a reduced-form logit regression to estimate the conversion probability and an NBD/Pareto model (an established model for noncontractual settings) to estimate the customer lifetime value. We conduct the analysis at three stages—A model-free analysis, a baseline model disregarding the attribution, and a full model. We estimate the model using a large advertisement dataset with over 10K brands and a consumer panel with more than 60K households and 6M purchases. The large number of households, brands and purchase observations in the dataset allows us to capture heterogeneity in consumer response both between brands and between consumers. We also demonstrate that carryover and spillover effects among different advertisement channels are exhibited both in short-run and long-run consumer behavior. Finally, we contrast the results of the baseline and full model to show that it is critical to account for attribution.

Presentation **Session Chair**
Saman Modiri, Syracuse University, Syracuse, NY

Session SB09 **Promotions - Field Experiments**
09
10:15 AM - 11:15 AM

Presentation 1 **Can Facing The Truth Improve Outcomes? Effects Of Information In Consumer Finance**
Jessica Fong[1], **Megan Kelly Hunter**[2], [1]University of Michigan, Ross School of Business, Ann Arbor, MI, [2]Stanford GSB, Stanford, CA, Contact: mkhunter@stanford.edu
Abstract: Information tracking services, such as Fitbit, MyFitnessPal, and Mint, are gaining in popularity as data becomes more easily available and accessible. These services often attract users through the notion that information can help them reach their goals. However, using data from a consumer finance company where individuals sign up to receive their credit report, we find that retention is the lowest for individuals who presumably would benefit from information the most - those who have low credit scores. This paper explores when individuals change their demand for information and the impact of information on financial health. Specifically, we first document a causal link between credit score trajectories and the demand for information. A decline in credit score decreases the likelihood the individual checks her credit score in the future. Second, we find this decrease in demand for information might be rational. We use variation induced by the firm's email campaigns and A/B tests to instrument for whether an individual checks her credit report in a given month. We find heterogeneous effects of information on credit score. Individuals with a declining credit score prior to checking her credit report experience a decline in credit score as a result of checking. However, there is no significant effect of information on credit score for those who did not have a declining credit score. This finding suggests that encouraging people to access information when they have a declining credit score, and thus a lower demand for information, may worsen their financial health.

Presentation 2 **ROLE OF GROUP COHESIVENESS IN TARGETED MOBILE PROMOTIONS**
Reetika Gupta[1], Sourjo Mukherjee[2], Kasthuri Jayarajah[3], [1]ESSEC Business School, Singapore, Singapore; [2]Audencia Business School, Nantes, France; [3]Singapore Management University, Singapore, Singapore. Contact: reetika.gupta@essec.edu
Abstract: The ubiquitous smartphone, a device embedded with a variety of sensors such as accelerometer, compass and even short-range radar, allows us to observe, capture and infer the everyday activity of millions of individuals. Such fine-grained data capture opens up new frontiers in human activity understanding at both the individual and societal scale (Misra and Balan, 2013). This mobile sensing technology, coupled with the almost universal adoption of smartphones across different geographies and economic segments, presents a unique opportunity for marketers to utilize this technology to reach, influence and persuade consumers. Understandably then, recent academic research in marketing too has focused on this phenomenon, notably in the area of targeted mobile promotions (e.g., m-coupons). While research in marketing has explored the effects of different targeted promotional strategies (temporal targeting, geographical targeting, crowdedness) (e.g., Luo, Andrews, Fang and Phang, 2013; Fong, Fang and Luo, 2015; Andrews, Luo, Fang and Ghose, 2015), it is yet to take into account the effect of social context, within which a consumer is situated, on her responses to mobile promotions. Accordingly, our objective is to examine the role of group cohesiveness in consumer's response to targeted mobile promotions. First, we developed a metric for measuring overall tie-strengths within individuals in a group and computed group cohesiveness from observational data. Next, we deployed this new metric in a field experiment to explore the effect of the group cohesiveness (high vs. low) on consumer responses to mobile promotions of varying promotional lead-times. We demonstrate that, in the presence of a more cohesive group (vs. dispersed group), consumers prefer promotions with shorter lead-times than longer lead times. Our research provides new targeting opportunities for marketers allowing them to tailor their promotional offers based on consumers' real time activities.

Presentation 3 **Double Points, Groupthink, And The Costliest Misconceptions In Hospitality Marketing**
Jim Sprigg, InterContinental Hotels Group, Atlanta, GA
Abstract: Hospitality programs use simple public earn-as-you-go promotions like "Double Points" to acquire customers, generate demand, and capture more share-of-stays. The rationale for these designs rests largely on three principles: 1. promotions must have a simple singular offer that is easy for customers to understand and remember, 2. the offer must be easy to communicate in public channels to attract new or disengaged customers, and 3. the earn-as-you-go incentive structure keeps participants constantly motivated to make the next purchase. However, we find that each principle is problematic, either because it is based on a false premise or because it does not predict optimal outcomes in the marketplace. We present evidence from observational data and large randomized field experiments to refute the accuracy or importance of each of the three principles above. We find that public messaging does little to increase promotional participation, and those customers who participate in promotions will respond more favorably to complex goal-based points offers than to simple singular earn-as-you-go offers. Lastly, we suggest possible reasons why these legacy designs persist in the industry.

Presentation 4 **The Impact Of Coupons On The Visit-to-purchase Funnel**
Arun Gopalakrishnan[1], Young-Hoon Park[2], [1]Rice University, Houston, TX, [2]Cornell University, Ithaca, NY, Contact: agopala@rice.edu
Abstract: Firms use coupons to stimulate demand. Although couponing is popular in practice, limited research has examined the causal effects of coupons on visit, search, and purchase behaviors among heterogeneous customers. In this paper, we explore coupon effects using data from a randomized field experiment with an online retailer in which customers were divided into two heterogeneous customer segments (low value and high value) with two types of coupon discounts (base value and better value). We find couponing is effective in increasing revenue, primarily by attracting customers who purchase without coupon redemption, and the lift in revenue per customer is larger for the high-value segment. Using clickstream data of customer visit and search behavior, we find most of the revenue lift arises from a corresponding lift in the likelihood of visiting the website under couponing. Though the lift in visit likelihood is relatively homogeneous across customer segments under the base coupon, the high-value segment has a higher purchase conversion rate than the low-value segment, leading to an amplified revenue lift. We also find a deeper discount leads to higher redemption and purchase conversion for the high-value segment but does not change visit likelihood. Finally, most of the search behaviors are unchanged under couponing, suggesting the mix of customers brought in under couponing are similar to those who visit without receiving the coupon promotion.

Presentation **Session Chair**
Arun Gopalakrishnan, Rice University, Houston, TX

Session SB10 **Marketing Strategy and Management I**
10
10:15 AM - 11:15 AM

Presentation 1 **A Blessing In Disguise: Implementing Exploration At An Exploitation-driven Financial Services Provider To Become Ambidextrous**
Christopher Schumacher, University of St. Gallen, St. Gallen, Switzerland. Contact: christopher.schumacher@unisg.ch
Abstract: Scholars from various research streams have accumulated an extensive body of literature on organizational ambidexterity, its antecedents, modes of balancing, and distinct performance outcomes. Despite these rich insights, little is known about how and under what conditions an ambidextrous orientation is implemented. This study investigates the phenomenon of organizational ambidexterity in financial services, an industry that is characterized by its knowledge-intensity and dynamic environment. We provide a nuanced understanding of how a multinational financial services provider implemented exploratory activities to complement its exploitation business to eventually become ambidextrous. Moreover, we show how capability-shifting and capability-building processes were combined to balance exploitation and exploration. We elaborate on capabilities that were shifted inside the organization and those that had to be built to achieve ambidexterity. Following an inductive research design, we conducted in-depth semi-structured interviews with internal and external stakeholders to develop a holistic multi-level view of the multinational financial services provider. Learning from four distinct business units, we outline patterns of structural and contextual mechanisms that foster the implementation of a dual-orientation across business units to simultaneously pursue exploitation and exploration. We report key factors in the implementation of ambidexterity.

Presentation 2 **The Effect Of Managerial Perceptions Of Performance Feedback On Firm Innovation Decisions**
Srabana Dasgupta[1], Nilesh Saraf[2], Daniela Blettner[2], [1]Simon Fraser University, Vancouver, BC, Canada; [2]Simon Fraser University, Burnaby, BC, Canada. Contact: srabanad@sfu.ca
Abstract: Firms' decisions to innovate are often driven by performance feedback. Specifically, firms measure the success of their performance relative to their own (historical) as well as competitors' (social) past performance, and these "feedback" effects can influence their decision to innovate in the future. Existing research that have documented the performance feedback effect use objective measures such as profitability or market share, but there is also evidence that managers' *perceptions* of relative performance are often inconsistent with each such objective measures. Very few empirical studies, however, measure managerial perceptions of their organization's relative performance. We study how the inconsistency between perceptual and objective performance feedback may affect the propensity to innovate using longitudinal survey data of Canadian organizations. Our analysis finds that consistency between perceptions and objective feedback increases the propensity for innovation, or conversely, as inconsistency increases between the two types of feedback it dampens innovation. We also find that positive perceptions strengthen the relationship between positive objective performance feedback and innovation, leading to increased search, whereas negative perceptions strengthen the relationship between negative performance feedback and innovation, echoing the problemistic search hypotheses. Finally, we find that perceptions moderate the effect of objective performance feedback differently in the social and historical dimensions as well above and below the aspiration thresholds.

Presentation 3 **A Customer Utility Framework For Firm Productivity**
Roland T. Rust[1], Ming-Hui Huang[2], **Xindi Zhao**[3], [1]University of Maryland, College Park, MD, [2]National Taiwan University, Taipei, Taiwan; [3]University of Maryland, College Park, MD, Contact: xindizhao@rhsmith.umd.edu
Abstract: The traditional firm productivity concept considers only a firm's internal production process that is typically measured as the ratio of input and output. This approach ignores that external customers are contributors to firm productivity and that the value of a firm's output is only realized when customers derive utility from the output. We provide a framework for firm productivity that considers the utility customers gained from their consumption experience as the key output. Specifically, we propose the concepts of Customer Experience Value (CEV) and Total Experience Value (TEV) as the output factors on the individual and aggregate customer level, respectively. Our framework highlights the subjective aspect of firm productivity, and recognizes that with the same internal production output, productivity can vary due to customer experience heterogeneity. We discuss approximations for input and output factors, and review assumptions and conditions for those measures to be appropriate. We provide guidelines for firms on how to measure productivity incorporating customer utility.

Presentation **Session Chair**
Xindi Zhao, Informs Account, College Park, MD

Saturday, June 13, 2020
Session "SC"
11:30 AM - 12:30 PM

SC01. Large-scale Experimentation and Machine Learning

SC02. Behavioral Insights from Text

SC03. Boosting Sales Force Productivity

SC04. Pricing in Display Advertising

SC05. Reviews III

SC06. Artificial Intelligence I

SC07. Empirical Policy Research 2

SC08. Modeling Customer Churn

SC09. Discounts and Incentives

SC10. Advertising and Firm Value

Session SC07 **Empirical Policy Research 2**
07
11:30 AM - 12:30 PM

Presentation 1 **Generous to a Fault? The Effect of Generosity of Employers' Retirement Plan Contributions on Leakage from Cashing Out at Job Separation**
Yanwen Wang[1], Muxin Zhai[2], John G. Lynch[3], [1]University of British Columbia, Vancouver, BC, Canada; [2]Texas State University, San Marcos, TX, [3]University of Colorado, Boulder, CO
Abstract: The US government imposes a 10% tax penalty to discourage pre-retirement leakage -- cash withdrawal from 401(k) retirement savings. We investigate the impact of employer matching contributions on leakage at job termination. In our unique data set with 597,980 employees covered by 29 retirement plans, 38% of employees leaked by cashing out 401(k) savings at job termination. Increasing the generosity of the employer / employee match rate increases retirement balances, reducing leakage. It also increases the proportion of one's balance contributed by the employer, increasing leakage. We interpret the latter effect as showing that employees are more likely to frame their retirement accounts as a rainy-day fund rather than a lock box of untouchable retirement savings when their employer contributed a greater proportion of the balance. We estimate that a 50% increase in employer / employee match rate would increase leakage probability by 14.5% at job termination. However, there could be an 11.2% *reduction* in leakage probability if employees ignore the extra incentive generated by the framing effect. Approximately 20% of accumulated assets from a 50% increase in match rate would leak out of the system due to framing bias attributable to the percent of assets contributed by employer.

Presentation 2 **Endogenous Products Provisioning and Prices in Merger Analysis - Case of Comcast and Time Warner**
Sriram Venkataraman, **Evgeniya Victorova**, UNC-Chapel Hill, Chapel Hill, NC, Contact: evgen@live.unc.edu
Abstract: Merger analysis is a key toolkit to evaluate merger deals that go before the Department of Justice's (DOJ) Antitrust Division. The econometric methods deployed in merger analysis examine ex-ante the welfare implications of the yet-to-be-merged firms make pricing decisions jointly. However, in most industries changes in market structure induced through mergers also directly impact the set of products firms offer to consumers (both by the yet-to-be-merged firms and other competing firms). Yet, the extant merger analysis and the corresponding welfare analysis is largely silent on the net welfare implications of both price and product provisioning following a yet-to-be-approved merger. This study addresses this research gap. We explore the welfare distortions from endogenous price and product choice in the empirical context of the U.S. multichannel television industry. We calibrate a structural equilibrium model and leverage its primitives to conduct a merger simulation of the recently attempted purchase of Time Warner Cable by Comcast. Our approach permits us to explore how prices and products offered by the yet-to-be-merged firm and its rivals would have changed if this historic merger were not called off due to legal and public scrutiny.

Presentation 3 **How the Massachusetts Assault Weapons Ban Enforcement Notice Changed Firearm Sales**
Kenneth Wilbur, San Diego, CA
Abstract: In 2016, the Massachusetts attorney general issued an Enforcement Notice to announce a new interpretation of the legal definition of banned assault weapons. We study that event to provide the first causal evidence of firearms policy on firearms sales. We observe the population of legally registered Massachusetts firearm sales from 2006-2017. We use an automated image classifier to tag Rifle sales as assault weapons or not. We estimate autoregressive models to predict the counterfactual firearm sales that would have occurred in the absence of the Enforcement Notice. We find that the Enforcement Notice increased sales of tagged assault rifles by 616% in the first 5 days, followed by a 9% decrease in the following three weeks. Sales of Handguns and Shotguns did not change significantly. Sales of tagged assault rifles were 28-30% lower in 2017 than in previous years, suggesting that the Enforcement Notice reduced assault weapon sales, and also that many banned assault weapons continued to be sold.

Presentation **Session Co-Chair**
Anita Rao, Chicago Booth, Chicago, IL

Presentation **Session Chair**
Kenneth Wilbur, University of California - San Diego, La Jolla, CA

Session SC02 **Behavioral Insights from Text**
02
11:30 AM - 12:30 PM

Presentation 1 **Presenter**
Oded Netzer, Columbia University, New York, NY
Abstract: In the creation of new science we rely on published science to guide our hypotheses, methodological development, and generation of new insights. Unfortunately, some research, although vetted during the review process, may not be replicable (Open Science Collaboration 2015). Using data from five replication studies in psychology and economics (Open Science Collaboration 2015; Many Labs 2014, 2015, 2018; Camerer et al. 2016, 2018), in this research we use machine learning and text mining methods to examine whether the language used in academic papers is predictive of their replicability. Our sample includes over 180 papers, and since our main interest lies in the textual features derived from their text, we slice the papers in multiple ways, including the entire paper, abstract, replicated study, and conclusion. We begin by examining whether the text can aid in predicting replicability above and beyond all other features of the paper and author (e.g., the field of research, number of studies, number of subjects, design of the replicated study, whether it was done online, number of tables, figures, and references, number of authors, their gender, rank, and citation count). Results show that the paper's textual information significantly improves prediction of replicability. The slice of text that was most predictive of replicability is the text in the replicated study. Next we investigated which words, dictionaries, and themes were more likely to discriminate between replicated and non-replicated papers. Using topic analysis methods and verified dictionaries, and controlling for paper and author variables, our results suggest that language that is more formal, logical, and confident appears more in non-replicable papers, while language that is more tentative and includes comparative words related to conjunctions and exclusions appears more in replicable papers.

Presentation 2 **D(opinion)/d(argument)- Quantifying Strategic Persuasion On Gun Control Debates**
Emaad Ahmed Manzoor, **Dokyun Lee**, George Huaien Chen, Alan Montgomery, Carnegie Mellon University, Pittsburgh, PA
Abstract: Persuading is challenging, even when the target person may be open-minded. In this exploratory work, we exploit a large-scale text dataset of debates containing ground-truth indicators of argument persuasiveness to link various argumentation strategies to successful persuasion. We begin by drawing on theories of argumentation from the informal logic literature to codify arguments in our dataset. We employ a semi-automatic strategy combining weak supervision and self-training to scale codification to thousands of debates containing tens of thousands of argumentative propositions. In order to control for textual confounders of persuasion (such as linguistic style, fluency, and readability), we propose an automatic text-control representation learning technique that constructs an embedding of the argumentative text to capture linguistic features that are independent of the argumentation strategies, while explaining additional variation in the data. Our empirical strategy reveals several confirmatory and counter-intuitive findings. We find that there is a negative correlation between persuadability and the existence of concessions (phrases of the form "I agree/acknowledge that...") in a debater's claims. We also find that successful persuasion is correlated with specific interactions between the strategies used in the debater's and opponent's arguments; for example, using a (contradictory) example to fight an analogy is more correlated with successful persuasion than using appeals to fear or threat.

Presentation 3 **What Makes Stories More Engaging? Continued Reading in Online Content**
Jonah Berger[1], Wendy W. Moe[2], **David A. Schweidel**[3], [1]University of PA- Wharton, Philadelphia, PA, [2]Robert H Smith School of Business, College Park, MD, [3]Emory University, Atlanta, GA
Abstract: More and more consumers read content online. They scan *Wall Street Journal* articles, catch up on sports, and peruse blogs on tech and celebrity gossip. But sometimes people read the whole piece of content and other times they only read a small portion. What about certain articles encourage sustained attention? Combining natural language processing of a unique dataset of over 700,000 page-reading sessions from over 35,000 articles with three experiments, we examine how textual features (i.e., the words used) shape reading. Results suggest that emotion plays an important role. Importantly, however, not all emotions increase reading. Consistent with research on appraisal and action tendencies, content that evokes anger and anxiety encourage sustained attention while content which evokes sadness discourages it. Textual features that increase processing ease (e.g., concreteness and familiar words) also increase sustained attention. Experimental evidence underscores the causal impact of emotion on reading and demonstrates that these effects are driven by uncertainty and arousal. These findings shed light on psychological drivers of reading and how to design content that will garner sustained attention.

Presentation 4 **The Joint Impact Of Text And Images On Persuasion:the Need For Multimodal Machine Learning**
Hortense Fong, **K. Sudhir**, Yale School of Management, New Haven, CT
Abstract: Advertising campaigns often weave together multiple modes---text, images, audio and video to enhance persuasion. We use data on images and text used in campaigns on an online fundraising platform in India, to study how the two modes jointly impact persuasion through its impact on shares and donations. We use recent advances in multimodal machine learning involving a multimodal tensor fusion network to represent the interactions across messages that account for the complementary and redundancy aspects of multiple modes, while using a deep learning model that combines signals across multiple modes to study their interactive impact on persuasion. Our results show that often used unimodal techniques lead to erroneous and biased inferences about how factors like emotionality, specificity and temporal proximity impact persuasion.

Presentation **Session Chair**
Jonah Berger, University of PA- Wharton, Philadelphia, PA

Session SC04 **Pricing in Display Advertising**
04
11:30 AM - 12:30 PM

Presentation 1 **Online Inference for Advertising Auctions**
Caio Waisman[1], Harikesh Nair[2], Carlos Carrion[3], Nan Xu[3], [1]Northwestern University, Evanston, IL, [2]Stanford University, Stafford, CA, [3]JD.com, Mountain View, CA
Abstract: Advertisers that engage in real-time bidding (RTB) to display their ads commonly have two goals: learning their optimal bidding policy and estimating the expected effect of exposing users to their ads. Typical strategies to accomplish one of these goals tend to ignore the other, creating an apparent tension between the two. This paper exploits the economic structure of the bid optimization problem faced by advertisers to show that these two objectives can actually be perfectly aligned. By framing the advertiser's problem as a multi-armed bandit (MAB) problem, we propose a modified Thompson Sampling (TS) algorithm that concurrently learns the optimal bidding policy and estimates the expected effect of displaying the ad while minimizing economic losses from potential sub-optimal bidding. Simulations show that not only the proposed method successfully accomplishes the advertiser's goals, but also does so at a much lower cost than more conventional experimentation policies aimed at performing causal inference.

Presentation 2 **The Bidding And Revenue Consequences Of First Price Auctions In Display Advertising**
Hana Choi[1], Carl F. Mela[2], [1]Simon Business School, University of Rochester, Rochester, NY, [2]Duke University, Durham, NC
Abstract: Online publishers recently deployed "header bidding" to increase advertiser competition for ad inventory by simultaneously collecting bids across multiple ad exchanges. Coincident with this change, ad exchanges migrated from second-price to first-price auctions. We consider the effect of this transition on advertiser bidding and the publisher revenue in this $50B market.
On the ad exchange side, a key rationale for the transition is that it can improve ad revenue by raising the expected clearing prices (Despotakis et al. 2019). On the advertiser side, though the transition to a first-price auction can lead to allocative efficiency by ensuring the highest bidder wins, bidding strategies have become more complex because competing bids across all ad exchanges must be considered. Whether and how (quickly) and which advertisers adapt to the change, such as how they shade their bids or respond to competition is an open question.
To measure these effects, we exploit Google Ad Exchange's transition to a first-price auction during which it randomly assigned ad impressions to first (vs. second) price auctions and integrate these data with a series of field experiments to create exogenous variation in reserve prices.

Presentation 3 **First-price Auctions In Online Display Advertising**
Amin Sayedi, University of Washington, Seattle, Seattle, WA
Abstract: We explain the rapid and dramatic move from second-price to first-price auction format in the display advertising market to be a simple consequence of the move from the waterfalling mechanism employed by publishers for soliciting bids in a pre-ordered cascade over exchanges, to an alternate header bidding strategy that broadcasts the request for bid to all exchanges. First, we argue that the move by the publishers from waterfalling to header bidding was a revenue improving move for publishers in the old regime when exchanges employed second-price auctions. Given the publisher move to header bidding, we show that exchanges move from second-price to first-price auctions to increase their expected clearing prices. Interestingly, when all exchanges move to first-price auctions, each exchange faces stronger competition from other exchanges and some exchanges may end up with lower revenue than when all exchanges use second-price auctions; yet, all exchanges move to first-price auctions in the unique equilibrium of the game. We show that the new regime commoditizes the exchanges' offerings and drives their buyer-side fees to zero in equilibrium. Furthermore, it allows the publishers to achieve the revenue of the optimal mechanism despite not having direct access to the advertisers.

Presentation 4 **Prominence In Marketing Channels**
Mao Yuan[1], Yi Zhu[2], [1]Huazhong University of Science and Technology, Wuhan, China; [2]University of Minnesota, Minneapolis, MN
Abstract: The growing dominance of online retailers such as Amazon and Alibaba has changed the landscape of digital marketing channels. This study examines the effects of the existence of a prominent retailer on price competition and profitability for channel members. Consumers sequentially search for price information across retailers and we define a prominent retail as the one that is searched first by all consumers. There are two types of consumers: some consumers have zero search costs (shoppers), while others have a positive search cost (non-shoppers). On the one hand, the existence of a prominent retailer can intensify competition between non-prominent retailers. On the other hand, prominence can worsen the double marginalization problem between the manufacturer and the prominent retailer. Comparing with the situation without a prominent retailer, we find that (1) the rise of a prominent retailer will weakly increase the manufacturer's wholesale price; however, it may decrease the average retail price if the fraction of shoppers is high; (2) non-prominent retailers are always worse off in their profits; (3) the manufacturer (the prominent retailer) is worse off in its profit when the search cost is high (low), whereas both of the manufacturer and the prominent retailer can be better off when the search cost is moderate and the fraction of shoppers is high.

Presentation **Session Chair**
Amin Sayedi, University of Washington, Seattle, Seattle, WA

Session SC03 **Boosting Sales Force Productivity**
03
11:30 AM - 12:30 PM

Presentation 1 **Managing Hybrid Sales Organizations**
Murali K. Mantrala[1], Yeji Lim[2], Olivier J. Rubel[3], [1]University of Missouri, Columbia, MO, [2]Columbia, MO, [3]UC Davis Graduate School of Management, Davis, CA
Abstract: To achieve growth, many firms deploy multichannel sales forces. In business-to-business markets for instance, it is common to find hybrid sales organizations where inside and field sales forces co-exist. Implementing such hybrid sales organizations allow firms to segment their customer base, where, for instance, mid-market prospects are assigned to inside sales reps, while large accounts or certain verticals are assigned to field agents. We analyze the problem of optimal incentive design for hybrid sales organizations. Specifically, we propose a principal-agent model to investigate how firms should structure hybrid sales organizations and design incentives to maximize profit. Our results allow us to investigate what is the optimal structure of the sales organization when selling activities are delegated to multitasking agents. *Key Words*: Multichannel Incentives, Principal-Agent Model, Sales Force

Presentation 2 **Do Activity-Based Incentive Plans Work? Evidence from a Large-Scale Field Experiment**
Madhu Viswanathan[1], Raghunath S. Rao[2], George John[3], Sunil Kishore[3], [1]Indian School of Business, Hyderabad, India; [2]University of Texas-Austin, Austin, TX, [3]University of Minnesota, Minneapolis, MN
Abstract: Despite theory-based expectations, and actual usage in practice, we lack any evidence about sales productivity gains from activity-based incentive (ABI) pay. Such plans incorporate activity scores from salespersons' call reports into incentive compensation. Securing the cooperation of a pharmaceutical firm, we undertook a three-year experiment involving an "ABI treatment-removal" design. Our first intervention added ABI pay for front-line salespeople and their supervisors across 305 sales territories. Our second intervention
d ABI pay from salespeople, and the third intervention
d them from the supervisors as well, thus returning to the status quo ante. We find a robust sales gain around 8% from each ABI intervention relative to the no-ABI baseline. These ABI sales effects are moderated by the number of salespeople in a territory with larger gains recorded in territories with more salespeople. Surprisingly, these sales gains are statistically indistinguishable regardless of whether ABI pay is provided to both supervisors and salespeople or just to the supervisors. The ABI effects on the behavioral activity measures show that supervisors exert behavior control downwards on salespeople when they (supervisors) are paid ABIs. All these results are robust to various threats to validity, including alternate specifications, attrition and accounting for the nesting of geographically adjacent territories. Managerially, our work supports tying incentive compensation to call reports despite the potential for self-serving biases in these measures, because supervisors exercise behavior control effectively. Keywords: Salesforce control theory, Principal-Agency theory, Activity-based incentives, Field Experiments

Presentation 3 **Impact of Quota on Negotiated Prices**
Pranav Jindal, UNC Chapel Hill, Chapel Hill, NC
Abstract: There exists a large body of work exploring the impact of compensation structure on salesperson's effort. A subset of this literature focuses specifically on the impact of quota on salesperson's effort in settings where prices are fixed. In this paper, we study how quota impacts the transacted prices in a setting where consumers can negotiate with the salespeople over product prices. Utilizing data from a large home appliance retailer in the continental U.S., we first show that the distance to quota has a positive effect on the discount the salesperson offers, but this effect is statistically significant only in the last week of the month. Next, we estimate a structural model of demand allowing for the negotiated price to depend on the distance to quota. We use the demand estimates to compare the profits under the current compensation scheme with (i) one where quota does not impact negotiated prices and (ii) where the firm does not allow price negotiation. Keywords: Price negotiations, bargaining, salesforce quota

Presentation 4 **Delegation, Centralization, Adelegation, Centralization, and Productivity in Industrial Salesforces**
Mrinal Ghosh[1], Richard Tang[2], Desmond Ho-Fu Lo[3], Arti Ghandi[4], [1]University of Arizona, Tucson, AZ, [2]Loyola Marymount University, Los Angeles, CA, [3]Santa Clara University, Santa Clara, CA, [4]Quintile IMS, Tucson, AZ
Abstract: Firms frequently decide on how much decision-making authority to delegate their field salespeople. We investigate (a) when and why firms choose to either delegate or centralize decision-making authority along two key sets of activities - those that prospect, target, and cultivate customers, which we term *task delegation*, and those that help negotiate price and close sales, which we term *price delegation* and (b) assess the complementarity between these two types of delegation in promoting salesperson's productivity. Proprietary data on salespeople selling industrial equipment shows that firms delegate both price- and task-related activities when salespeople have significant information advantage; otherwise, they centralize. Importantly, their complementarity - either delegate or centralize both types of decision-making authority as a "bundle" - is necessary to achieve high levels of productivity; i.e. delegating or centralizing both activities generates higher salesperson productivity than delegating only one and centralizing the other set of activities. We provide theoretical insights and managerial guidance on when, how, and to which salespeople should firms allocate decision authority.

Presentation **Session Chair**
Murali K. Mantrala, University of Missouri, Columbia, MO

Session SC01 **Large-scale Experimentation and Machine Learning**
01
11:30 AM - 12:30 PM

Presentation 1 **A Bandit Approach to Multiple Testing with False Discovery Control**
Lalit Jain, Kevin Jamieson, University of Washington, Seattle, WA
Abstract: We propose an adaptive sampling approach for multiple testing which aims to maximize statistical power while ensuring anytime false discovery control. We consider n distributions whose means are partitioned by whether they are below or equal to a baseline (nulls), versus above the baseline (actual positives). In addition, each distribution can be sequentially and repeatedly sampled. Inspired by the multi-armed bandit literature, we provide an algorithm that takes as few samples as possible to exceed a target true positive proportion (i.e. proportion of actual positives discovered) while giving anytime control of the false discovery proportion (nulls predicted as actual positives). Our sample complexity results match known information theoretic lower bounds and through simulations we show a substantial performance improvement over uniform sampling and an adaptive elimination style algorithm. Given the simplicity of the approach, and its sample efficiency, the method has promise for wide adoption in the marketing, and online A/B/n testing problems.

Presentation 2 **Revenue-Optimal Dynamic Auctions for Adaptive Ad Sequencing**
Omid Rafieian, University of Washington, Seattle, WA
Abstract: Digital publishers often use real-time auctions to allocate their advertising inventory. These auctions are designed with the assumption that advertising exposures within a user's browsing or app-usage session are independent. Rafieian (2019) empirically documents the interdependence in the sequence of ads in mobile in-app advertising, and shows that dynamic sequencing of ads can improve the match between users and ads. In this paper, we examine the revenue gains from adopting a revenue-optimal dynamic auction to sequence ads. We propose a unified framework with two components -- (1) a theoretical framework to derive the revenue-optimal dynamic auction that captures both advertisers' strategic bidding and users' ad response and app usage, and (2) an empirical framework that involves the structural estimation of advertisers' click valuations as well as personalized estimation of users' behavior using machine learning techniques. We apply our framework to large-scale data from the leading in-app ad-network of an Asian country. We document significant revenue gains from using the revenue-optimal dynamic auction compared to the revenue-optimal static auction. These gains stem from the improvement in the match between users and ads in the dynamic auction. The revenue-optimal dynamic auction also improves all key market outcomes, such as the total surplus, average advertisers' surplus, and market concentration.

Presentation 3 **Returns to Personalized Product Quality**
Ali Goli, University of Chicago, Chicago, IL
Abstract: While the impact of endogenous price choice has been well studied in the literature, the fact that product choice and quality are also endogenous is often neglected in the literature. Similarly in the pricing literature counterfactual exercises often optimize prices for products offered by a firm taking the set of products and qualities as given. Using a number field experiments at Pandora, we illustrate the role of endogenous product line quality. Particularly, the paper aims at illustrating the relative importance of product quality and pricing decisions. Pandora offers two tiers of product, namely, an ad supported version and a paid subscription that suppresses ads. The field experiments exogenously shift the quality of the ad supported version by changing the number of ad impressions shown to individuals in different experiment cells. This quality of service metric, number ads shown to individuals, is regarded as an implicit price though charged in time units for individuals using the ad supported version. Not only the relative heterogeneity of response to these implicit prices charged in time units and the subscription prices charged in dollars are of interest by itself, the paper highlights the importance of optimizing this quality metric by measuring its relative impact on profits compared to the prices charged for subscription services. Furthermore, the paper intends to show the role of discrimination along both prices and quality by comparing profits in different scenarios where discrimination along one dimension is allowed but uniform decisions are made along the other one. The results are of importance for a wide variety of products and services and are readily applicable in contexts like pay walls, ad supported media, and mobile apps.

Presentation 4 **Design and Evaluation of Personalized Free Trials**
Hema Yoganarasimhan[1], Ebrahim Barzegary[1], Abhishek Pani[2], [1]University of Washington, Seattle, WA, [2]University of Maryland, College Park, MD
Abstract: Free trial promotions, where users are given a limited time to try the product for free, are a commonly used customer acquisition strategy in the Software as a Service (SaaS) industry. We study the problem of how to personalize the length of the free trial promotion that a user receives to optimize conversions. A recent literature combines ideas from the machine learning literature with causal inference paradigms to derive heterogeneous treatment effects that can be used to develop personalized targeting policies. However, there is no consensus on which estimators are ideal for this task. We examine this question using data from a large-scale field experiment conducted by a leading SaaS firm, where new users were randomly assigned to 7, 14, or 30 days of free trial. We develop seven personalized targeting policies based on linear regression, lasso, CART, random forest, XGBoost, causal tree, and causal forest, and evaluate their performances using the Inverse Propensity Score (IPS) estimator. We find that the personalized policy based on lasso performs the best, followed by the one based on XGBoost. In contrast, policies based on causal tree and causal forest perform poorly. We then link a method's effectiveness in designing a policy with its ability to personalize the treatment sufficiently without over-fitting (i.e., capture spurious heterogeneity). Finally, we show that policies designed to maximize short-run conversions also perform well on long-run outcomes such as consumer loyalty and profitability.

Presentation **Session Chair**
Hema Yoganarasimhan, University of Washington, Seattle, WA

Session SC05 **Reviews III**
05
11:30 AM - 12:30 PM

Presentation 1 **The Effects Of National Culture And Customer-initiated Contacts On Online Review Sharing**
Uyen Uyen T. Banh[1], Sandeep Arora[2], [1]University of Manitoba, Winnipeg, MB, Canada; [2]University of Manitoba, Winnipeg, MB, Canada. Contact: banhuu@myumanitoba.ca
Abstract: With the rapid growth of Internet, online reviews have become easily accessible and consumers rely more and more on the opinions of others when making purchase decisions (Bernick 2017; Nielsen 2012). Online shoppers trust peers' opinions 12 times more than marketer-initiated sources (eMarketer 2010), and 92% of online customers read and use verbatim review comments when making purchase decisions (ChannelAdvisor 2010). The growth of Internet has also facilitated firm expansion into international markets. Competing globally offers firms many opportunities, including potential new customers (Burgess and Steenkamp 2006; Chao, Samiee, and Yip 2003). However, global expansion also involves risk and uncertainty due to the diverse consumer base in international markets. Consumer behaviors may differ across countries depending on various factors, including national culture (Douglas and Craig 2011; Hofstede 1984). Hence it is not surprising that understanding the impact of national culture on systematic differences in consumer behaviors across countries has been the focus of marketing research (Petersen, Kushwaha, and Kumar 2015). Given the importance of online reviews and the widespread international expansion, effectively leveraging online reviews, beyond national boundaries has become a new challenge for firms (Kumar, Sunder, and Ramaseshan 2011). Unfortunately, current research on online reviews offers little guidance in this area. Most of the extant research on online reviews has focused on the U.S. or a single country (Tang 2017). We fill this gap by answering two research questions. First, how individualism and uncertainty avoidance affect the decision to share online reviews and second, how these national dimensions moderate the link between customers' interactions with firm and online review sharing. We investigate our research questions using 7-year longitudinal data from an e-commerce app developer who provides service to 200,000 online retailers globally. Our analysis confirms the hypothesized effects and provides theoretical and managerial implications.

Presentation 2 **Social Influence Reduces the Adjustment Speed of Online Reviews to New Quality Levels**
Leif Brandes[1], Egon Franck[2], Rosa M. Cacabelos Otero[2], [1]University of Lucerne, Lucerne, Switzerland; [2]University of Zurich, Zurich, Switzerland.
Abstract: Consumers frequently consult online reviews for categories, in which product quality may change over time. Examples include hotels, restaurants, healthcare services, and software applications. A key concern for businesses and consumers in such categories is that past reviews may not reflect current quality levels. The present research explores the idea that exposure to past reviews during review provision reduces the adjustment speed of rating averages to new quality levels. Two experiments, in which participants had to write online reviews for a utilitarian software application, provide converging evidence that past reviews bias rating scores for current quality levels as long as a product's quality change is not too large. The detected bias in our research is symmetric across positive and negative past rating environments, and is sufficiently strong to reduce the diagnostic value of online ratings for products with different quality levels and opposite pasts (i.e., a superior product with a negative past, and an inferior product with a positive past). This symmetry stands in stark difference to previous findings for hedonic products that are characterized by less-similar tastes than utilitarian products. Overall, our results show that past reviews can both be a blessing and a curse for firms when product quality is dynamic and tastes are similar.

Presentation 3 **Examining The Relationship Between Reviews And Sales: The Role Of Disclosing Purchase Information**
Yi Yin[1], Shantanu Mullick[2], Ashwin Malshe[3], Suman Basuroy[4], [1]University of Texas-San Antonio, San Antonio, TX, [2]Eindhoven University of Technology, Eindhoven, Netherlands; [3]University of Texas at San Antonio, San Antonio, TX, [4]University of Texas-San Antonio, San Antonio, TX, Contact: yi.yin@utsa.edu
Abstract: Although consumers perceive eWOM as a reliable source to get product information, there is an increasing concern that strategic review manipulation by either the company or its competitors impairs the credibility and informativeness of online reviews. Therefore, sellers have started identifying reviews from people who have made "confirmed purchases". User reviews with a confirmed purchase tag are fast becoming pervasive, but academic research on their impact on product sales remains scarce. The authors argue that the confirmed purchase tag is a proxy for source credibility, and such credibility signal is more important when a product is new to the market. Accordingly, the current study seeks to answer (1) whether reviews with a confirmed purchase tag have a larger impact on sales compared to reviews without a confirmed purchase tag and (2) whether the relative impacts of reviews with a confirmed purchase tag vary over time. To that end, the authors estimate a Bayesian Dynamic Linear Model using weekly sales rank data and customer reviews from Amazon.com for books published in 2017. The estimation accounts for the endogeneity in the effects of online reviews on sales by using novel instrumental variables derived using detailed historical reviewing activities of individual reviewers. The authors find that reviews with a confirmed purchase tag have a more positive impact on book sales compared to reviews without the tag. Furthermore, the impact of reviews with a confirmed purchase tag on book sales changes dynamically - reviews with a confirmed purchase tag lead to higher sales when a book is new, but its impact attenuates as time goes by.

Presentation **Session Chair**
Yi Yin, University of Texas-San Antonio, San Antonio, TX

Session SC06 **Artificial Intelligence I**
06
11:30 AM - 12:30 PM

Presentation 1 **Are Paid Memberships The New Loyalty? An Empirical Investigation Of Fee-based Loyalty Program On Customers' Purchase Behavior**
FANGFEI GUO[1], YAN LIU[2], [1]Texas A&M University, College Station, TX, [2]Texas A&M University, College Station, TX, Contact: fguo@mays.tamu.edu
Abstract: Paying membership fees in exchange for membership privilege has become a novel trend in loyalty program design. Despite the prevalent adoption of Fee-based Loyalty Programs (FLPs) in retailing, their effectiveness has not been studied. The current research examines the impact of FLP enrollment on customers' spending and contributed revenue with machine learning techniques. The authors find that customers' annual spending increases by 43% and contributed revenue grows by 67%, on average, after enrolling in FLP. Such increases are primarily driven by higher purchase frequency. Moreover, FLP with free shipping benefit reduces customers' purchase cost, making customers broaden their purchase categories during their membership tenure, and become less price-sensitive. Causal Forest (CF) demonstrates that the treatment effects of FLP vary across customers' enrollment periods and customer segments. Compared to the low and high buyers, customers' purchases at moderate-level in the pre-enrollment period are most likely to spend more and contribute more revenue to the company. These findings also suggest that companies should wisely allocate their marketing resources to encourage their best-valued customers to subscribe to FLP.

Presentation 2 **Alexa, I Want It Now: How Conversational Agents Shape Consumer Decisions**
Sang Kyu Park[1], Yegyu Han[2], Aner Sela[1], [1]University of Florida, Gainesville, FL, [2]Virginia Tech, Blacksburg, VA, Contact: sangkyu.park@warrington.ufl.edu
Abstract: AI-enabled conversational platforms (e.g., Alexa, Google Assistant) are gaining popularity, but do they influence consumer choice, and if so how? Seven studies, using Amazon Echo devices, show that consumers tend to splurge on hedonic options, prefer earlier rewards, and make more impulsive choices when interacting with a conversational AI platform than when choosing on a computer screen or conversing using text with a chat-bot. The studies suggest that these effects result from consumers' decreased attention to quantitative details, such as price, when listening to conversational AI platforms. This is driven by the synchronous, transient nature of conversations which increases attentional demands and hinders careful information processing. Alternative explanations, including social presence, social norms, and unnaturalness are not supported. The findings make contributions to research on information processing, impulsivity, marketing channels, and the emerging field of consumer-AI interaction.

Presentation 3 **Consumer Responses To Identical Vocal Tones Differ When Attributed To Smart Agents Vs. Humans**
Yegyu Han[1], Dipankar Chakravarti[2], [1]Virginia Tech, Blacksburg, VA, [2]Virginia Tech, Ellicott City, MD, Contact: yegyuhan@vt.edu
Abstract: With advances in speech and voice recognition software and artificial intelligence, consumers' acceptance of smart agents such as Amazon's Echo or Google Assistant is showing rapid growth. Consumers are getting used to delegating various household tasks including purchases to these smart agents. Technologies that can recognize and express emotions are also likely to enable these machine agents to communicate more naturally with consumers and are likely to support humans in selling functions. As such, there is an increased need to understand how consumers perceive and interact with these smart agents. Will consumers apply the same conversational norms to the smart agents as they do to humans? What differences are likely to emerge and why? We report two experiments examining how vocal characteristics (rational vs. emotional) designed into smart agents (vs. human agents) influence consumer trust and persuasion in a purchase interaction context. By keeping the voices constant and solely manipulating whether the interacting agent is identified as a smart agent or a human agent, we demonstrate that consumers differ in their expectations and norms for smart agents and humans. The effect of an emotional (vs. rational) voice in persuasion was stronger when the agent was identified as a human versus a smart agent. More importantly, a persuasion knowledge manipulation negatively influenced both trust and persuasion when the recommendation was made by a human agent using an emotional tone. However, this effect did not occur for a smart agent. In summary, our results show that consumers perceive and evaluate smart agents and humans differently, even when they communicate using identical voices.

Presentation 4 **Object-Oriented Anthropomorphism as a Mechanism for Understanding AI**
Donna Hoffman, Thomas Novak, George Washington University School of Business, Washington, DC
Abstract: Viewing AI through an anthropomorphic lens can be dangerously misleading. Recent studies of California autonomous vehicle (AV) crashes show that most involve a smart car being rear-ended by a car driven by a human (Automotive News 2018). This is apparently because humans anthropomorphize AVs, expecting them to behave just like human drivers, rolling through stop signs, speeding up to beat yellow lights, and going faster than the speed limit. Much research has focused on developing anthropomorphized AI systems in the belief that rendering them "like us" will promote adoption and acceptance (Zlotowski, et.al. 2015). Yet, anthropomorphizing AI systems is "one of the big obstacles in the way of actually trying to understand how they might impact the world in the future" (Bostrom 2019). Indeed, anthropomorphizing AI runs the risk of obscuring its underlying mechanisms. We may think it has capacities it does not possess and misunderstand the capacities it does possess. This undermines AI and has the potential to lead to overtrusting it, lending AI more trust than it deserves. In three studies, we used a novel object-oriented approach based on how AI actually sees compared to how we as humans imagine it might see (Bogost 2012; Harman 2005; Hoffman and Novak 2018; Novak and Hoffman 2019). Our studies demonstrate that manipulating the metaphors we use to describe AI can stimulate an object-oriented vs anthropomorphic process of evaluation that significantly impacts perceptions of AI capacities. Our findings have implications for how to stimulate adoption among non-users by focusing on the communal aspects of use rather than agentic use cases. At the same time, the results suggest opportunities for mitigating trust concerns among users by emphasizing the non-human capacities of AI.

Presentation **Session Chair**
Donna Hoffman, George Washington University School of Business, Washington, DC

Session SC10 **Advertising and Firm Value**
10
11:30 AM - 12:30 PM

Presentation 1 **The Effect Of Channel Deletion On Firm Value And Firm Risk**
Binay Kumar, V. Kumar, Georgia State University, Atlanta, GA, Contact: bkumar1@gsu.edu
Abstract: With the advent of online, mobile, and social media channels, firms have included an array of channels in their channel mix. A firm may utilize numerous channels in its multichannel strategy. However, it is the quality of the channel mix rather than the quantity that is key in satisfying the firm's customer base. The proliferation of channels has increased marketing costs without providing commensurate benefits and is detrimental to a firm's competitive position. While channel additions have not yielded the expected benefits, firms are finding ways to reduce costs. Channel deletion is an emerging phenomenon in the real world and is currently receiving special attention in the industry given its ability to reduce the costs of operation. Although channel deletion aims to reduce the cost of operation thereby improve efficiency, there is a perception of risk (i.e., uncertainty over future cash flow). Using a panel data sample of 115 publicly traded U.S. firms across 39 industries over a five year period, we demonstrate that channel deletion can influence both firm value and firm (stock) risk. The preliminary results indicate that channel deletion enhances firm value (measured by abnormal stock return) significantly. However, the value creation due to channel deletion is attenuated by market turbulence. Further, channel deletion is positively associated with firm risk, and the reputation of the firm helps in reducing the risk. The study offers important implications regarding the effect of channel deletion and provides direction for marketing theory and practice.

Presentation 2 **Going Digital To Conform And To Perform: Learning Mechanisms Underpinning The Budgetary Decision On Digital Advertising**
Seoyoung Kim, Sundar G. Bharadwaj, University of Georgia, Athens, GA, Contact: seoyoungkim@uga.edu
Abstract: Despite our rich understanding of whether or how much, when, and how digital advertising contributes to a firm, the literature lacks an understanding of the factors leading firms to allocate budgets to digital advertising. This research attempts to fill the research gap in the literature by addressing the following: (1) What are the drivers of relative budgetary allocation on digital advertising? (2) Under which conditions do the drivers influence a firm more? Drawing on neo-institutional and learning theories, this study adds insights to the marketing literature by viewing a firm as an entity aiming to attain legitimacy as well as performance through its decision about digital advertising budget. In pursuit of two goals, a firm learns not only from its own experience of responses from consumers (i.e., consumer response learning) and investors (i.e. capital market learning), but also from external learning sources such as competitors' decisions (i.e., mimetic learning), behavioral changes of consumers in the marketplace (i.e., marketplace learning), and societal values (i.e., normative learning). While these learning opportunities influence the strategic decision a firm makes, the effect is contingent on the firm's learning motivation (i.e., market uncertainty) and learning ability (i.e., absorptive capacity). We estimate a structural panel vector autoregression model using the multi-source data composed of advertising spending from Kantar's Ad$pender, financial measures from Compustat, CRSP and SDC Platinum, nation-wide e-commerce sales data from US Census Bureau, media coverage data from Lexis Uni, and 10-K reports from Edgar database. We find that a firm's decision about its digital advertising budget is affected by various learning opportunities. Consistent with our expectation, the learning is contingent on a firm's perceived uncertainty as well the absorptive capacity of the firm. By delineating antecedents of the budgetary decision on digital advertising, this research aims to complement the extant knowledge on the consequence of the digital ad spending.

Presentation 3 **Bias In Kantar Ad$pender: Consequences And Remedies**
Ashwin Malshe[1], Yi Yin[2], Pallav Routh[1], [1]University of Texas at San Antonio, San Antonio, TX, [2]University of Texas-San Antonio, San Antonio, TX, Contact: ashwin.malshe@utsa.edu
Abstract: American companies collectively spent an estimated $240 billion on advertising in 2019 (eMarketer), underscoring the importance of advertising in marketing budgets. There is little surprise that research involving advertising expense occupies a key position in academic marketing research. Prior empirical research primarily obtained advertising expense information from two sources: Compustat and Kantar Ad$pender. Whereas Compustat advertising is the total advertising expense reported by publicly listed companies in their annual regulatory filings, Kantar estimates brand advertising spend based on monthly paid media exposures of those brands. Over the last decade, marketing studies have increasingly shown a preference for Kantar over Compustat because Kantar provides wider coverage, reports ad spending for multiple channels, and is available at a higher frequency. However, a major drawback of Kantar is that their advertising expense is an estimate of real spending. To the best of our knowledge, there is no extant study that has systematically validated Kantar ad expense data.
In this research, the authors analyze advertising expenses from Kantar and Compustat and find that compared to Compustat, Kantar systematically underestimates advertising expenses by about 65 percent. Further, using advertising expenses from both Kantar and Compustat independently, the authors replicate past research on (1) advertising elasticities, (2) impact of advertising on systematic risk, (3) determinants of advertising intensity, and (4) abnormal returns based on advertising portfolios. The results show that underestimation from Kantar leads to (1) substantial underestimation of firm advertising elasticities, (2) non-significant impact of advertising on systematic risk, and (3) non-significant abnormal returns to portfolios created with firms sorted on advertising intensity. The authors propose using Random Forest to predict real advertising expenses from estimated Kantar advertising, which can be used as a "corrected" Kantar advertising expense.

Presentation 4 **Ad Agency Compensation Before And During The Digital Age**
Sharon Horsky, Hebrew University at Jerusalem, Jerusalem, Israel. Contact: sharon.horsky@huji.ac.il
Abstract: A crucial element in the relationship between the firm and its advertising agency is the design of an effective compensation plan for the advertising agency which aligns the incentives given to the agency with the overall objectives of the advertiser. With the increasing complexity in the media landscape, we show that advertisers are changing their ad agency connections. In this paper, we show changes in the type of agents chosen, the number of agencies used, and the way they are compensated. We also investigate trends in digital agency compensation given the rapid growth in the use of digital advertising. We compare whether the methods and trends in digital agency compensation are different from those in the "traditional" media.

Presentation **Session Chair**
Sharon Horsky, Hebrew University at Jerusalem, Jerusalem, Israel.

Session SC08 **Modeling Customer Churn**
08
11:30 AM - 12:30 PM

Presentation 1 **Scalable Data Fusion With Selection Correction: An Application To Customer Base Predictions**
Daniel McCarthy[1], Elliot S. Oblander[2], [1]Goizueta Business School, Emory University, Atlanta, GA, [2]Columbia Business School, New York, NY, Contact: daniel.mccarthy@emory.edu
Abstract: When modeling customer behavior, some analysts rely upon aggregated data provided by first parties, while others rely upon granular data provided by third parties, such as credit card panels. Leveraging all data sources simultaneously could allow for better predictions and richer insights. However, existing approaches for aggregate-disaggregate data fusion are difficult to use in this context for several reasons: the granular data may not be representative of the target population as a whole, the target population may be very large (e.g., all potential customers of a company), and both data sources may suffer from missingness. We propose an aggregate-disaggregate data fusion method which is computationally scalable to massive populations and allows for censored and/or truncated, non-representative granular data. We apply the method to a model for customer acquisition and churn at subscription-based firms. We then bring the model to life using data from Spotify, a music streaming service, and a large credit card panel dataset. This empirical application and supporting simulations show that incorporating granular third party data through our data fusion method improves predictions, enhances model identification, and offers richer insights than extant approaches. In particular, we predict future aggregated metrics more accurately and separate out the initial versus repeat behavior of customers, providing deeper insight into acquisition and retention dynamics driving growth.

Presentation 2 **Leveraging Fine-grained Mobile Data for Churn Detection through Essence Random Forest**
Christian Colot, Universite de Namur, Namur, Belgium.
Abstract: The rise of unstructured data leads not only to unprecedented opportunities for marketing applications but also to new methodological challenges to leverage it. In particular, redundancy among extracted features from this data deserves special attention as it might prevent current methods to benefit from it. In this study, we propose an adaptation of the Random Forest algorithm called Essence Random Forest to solve this issue. Analysing fine-grained data of a telephone company for churn detection, we establish that Essence Random Forest better leverages the value of unstructured data on two dimensions: besides a better classification performance, it also converges quicker to stable results. In addition, from a managerial perspective, we highlight that geo-spatial mobility data might be a good alternative to the classical communication network from which the data quality might decrease due to the emergence of alternative communications applications. Finally, an Essence Random Forest model that includes all fined-grained data sources is able to outperform any individual model, which validates the quest of many companies for alternative data sources.

Presentation 3 **What Machines Learn from Customer History: From RFM to LSTM**
Jan Valendin, et al., Vienna School of Economics and Business, Wien, Austria.
Abstract: Customer heterogeneity is embraced in modern customer-centric business models, and managers are very interested in capturing and serving to the behavioral differences between individuals. However, statistical models for predicting customer behavior in noncontractual business settings have their limitations: they are typically derived from a small set of individual summary statistics and hence ignore some of the subtle differences between customers, they make rigid assumptions regarding the purchase and the dropout process, including covariates is oftentimes impossible, and the derived forecasts ultimately present customer future in a simplified way. Our recurrent neural network model, built around a Long Short-Term Memory (LSTM) component, automatically builds useful features directly from raw transaction histories to then produce accurate predictions of future behavior. These predictions capture individual-level behavioral dynamics, group behavior, and large scale trends such as seasonal patterns. In our empirical study we examine the model's performance in seven diverse scenarios with varying transaction frequency, cohort size, and calibration history length, showing improved forecasting accuracy against popular benchmark methods. The predictive performance of our approach further benefits from accounting for time-varying or time-invariant context factors which can be readily incorporated in the model. Finally, we present an extension allowing to predict multiple variables of interest with a single model.

Presentation 4 **Brand Retention under Radical Innovation: The Case of Cloud Disruption in B2B Software Markets**
Baris Kocaman, Sarah Gelper, Fred Lagerak, Eindhoven University of Technology, Eindhoven, Netherlands.
Abstract: Retaining customers is a vital part of value creation. Especially in today's markets, managing retention poses a significant challenge since new technologies and radical innovations disrupt extant business practices and customer expectations. In such markets, existing customers constitute a great potential for the survival of incumbent brands because of their established relationships. Yet the customer's consideration to adopt a new technology might, at the same time, trigger their consideration to adopt a new brand. This article investigates how technology-enabled radical innovation affects brand retention probabilities in the context of cloud disruption in B2B software markets. Using a large panel data set on software usage of 4,659 customers of the 30 largest software brands across 5 functionalities (CRM, ERP, BI, HR and Finance), we compare brand retention probabilities on the individual customer level before, during, and after cloud adoption. For this comparison, we model the state dependence for individual software usage in relation to the customer's technology migration decision. The model controls for brand preference heterogeneity to identify the true state dependence. Our results show that brand retention at the moment of cloud adoption is only 65.47%, which is much lower than the baseline brand retention of 98.12% when staying with the old on-premise solution. After cloud adoption, brand retention again increases to 96.29%. The strong decline in brand retention at the moment of cloud adoption is more pronounced for brands with lower market shares and for earlier stages of cloud diffusion in the market.

Presentation **Session Chair**
Baris Kocaman, Eindhoven University of Technology, Eindhoven, Netherlands.

Session SC09 **Discounts and Incentives**
09
11:30 AM - 12:30 PM

Presentation 1 **Size Matters: How Consumers' Energy Drink Consumption Is Affected By Package Size Changes**
Lai Jiang[1], Ting Zhu[2], Pradeep Chintagunta[3], **Saad Andalib Syed Shah**[1], [1]University of California, Irvine, IRVINE, CA, [2]Purdue University, WEST LAFAYETTE, IN, [3]University of Chicago, Chicago, IL, Contact: ssyedsha@uci.edu
Abstract: This paper examines the impact of new product introduction on consumers' demand for energy drinks. In particular, we are interested in how consumers responded to Red Bull's new product with larger package sizes and whether such product innovation strategy helped Red Bull gain a higher market share and increased the consumers' total energy drink consumption. We build a demand model of consumers' choices on energy drinks. We find that quantity-discounts (due to larger sizes) and consumers' preferences for larger sizes, increased consumers' Red Bull consumption. According to our estimation results, it increased as much as 29.76% and 47.06% with the introduction of 12 oz and 16 oz cans respectively. We find that the total consumption of energy drinks by the regular users decreased for the introduction of 12 oz and increased for the introduction of 16 oz. While the introduction of larger package sizes may be profitable for manufacturers like, Red Bull, it might impose social costs as a large and growing body of scientific evidence demonstrates that energy drinks are harmful to health. As a consequence, policy options such as 'soda-tax' or 'cap-rule' have been suggested. We compare the relative efficacy of these options in our counterfactual analysis and find that a 'cap-rule' which limits the size of a can 8.4 oz is more effective than a 1 cent per oz soda tax in reducing consumers' energy drink consumptions.

Presentation 2 **Gifts, Self-signaling And Charitable Donations**
Raghunath S. Rao[1], Andreas Kraft[2], [1]University of Texas-Austin, Austin, TX, [2]The University of Texas at Austin, Austin, TX, Contact: raghunath.rao@mccombs.utexas.edu
Abstract: Marketing is a key activity for non-profit organizations as they seek to raise funding. One of the most common and visible fundraising tools is giving donors a gift to incentivize donation. We study this practice in conjunction with consumers' motivation for self-signaling. Using a large field study that raised close to USD 100K, we show that framing of the gift (e.g., as a fixed donation vs. and an open donation) had a significant effect upon donors. Specifically, the attractiveness of the merchandise to donors improved the donations received under a suggested donation amount while reducing the payments under when no such suggestion was offered (so gist could be obtained for free) due to self-image "crowding-out" effect. Overall, our findings have substantial practical lessons for charities and other non-profits seeking donations for the provision of a public good.

Presentation 3 **Does Reward Redemption Spur Consumer Spending? An Empirical Analysis Of Credit Card Transactions**
Serim Hwang[1], Hui Li[2], Alan Montgomery[2], [1]Carnegie Mellon University, Pittsburgh, PA, [2]Carnegie Mellon University, Pittsburgh, PA, Contact: serimh@andrew.cmu.edu
Abstract: Reward credit cards are the most popular type of credit card. They account for over 60% of all credit cards issued. Researchers have found that the more attractive the reward program is, the more loyalty consumers show. The performance of the credit card reward program on consumer loyalty has been widely studied, but no research has shown how the rewards impact overall spending or, more specifically, spending in different categories. In this paper, we research three questions: (1) Do rewards increase the amount of spending, compared with the amount before redemption? (2) Do rewards increase spending within and across the categories? (3) How do rewards affect future spending, both in the short-term as well as the long-term? To answer our research questions, we develop a dynamic structural model of consumer redemption and spending decisions in the short and long run for spending within and across these categories: clothing, entertainment/trip, food, and general retailers. We leverage a unique, anonymized transaction dataset provided from a US bank that tracks credit cardholder's spending and reward redemption at the merchant level. Importantly, we find that rewards have spillover effects on the future spendings, which shows that there is a dynamic relationship between current rewards and future spending. The rewards in less common categories augment spending while rewards in more common categories reduce spending. Our results show that entertainment/trip rewards increase spending in the same category while clothing rewards increase the spending in the other categories. However, food rewards lead to a decrease in spending in all categories. Interestingly, not well-matched rewards may decrease the total spending in the long run. We conduct counterfactuals to show how our proposed rewards policy can improve the decrease in spending. Based on our results, the bank can implement a tailored reward program that provides different incentives for redemption by category. Also, the bank could design dynamic reward programs that encourage redeemers to become more engaged in using credit card.

Presentation 4 **The Two-edged Sword Effect Of Sacrifice Signaling On Monetary Donation**
Gil Peleg[1], Oded Lowengart[2], Daniel Shapira[3], [1]Yeshiva University, NYC, NY, [2]Ben Gurion University, Beer Sheva, Israel; [3]Guilford Glazer School of Business & Management, Beer Sheva, Israel. Contact: gil.peleg@YU.edu
Abstract: When beneficiaries fundraising money for noble causes, they often incentivize donors with a variety of promised rewards such as a monetary reward (e.g. tax deduction), a symbolic token of appreciation (e.g. red noses or pink ribbons pins) or social recognition evoke from donation advertising to name a few. This research focuses on the relationship between the effectiveness of social recognition schemes as an operative motivation for incentivizing donations. Specifically, we introduce an analytical model that incorporates information provided by beneficiaries regarding donations to analyze its influence on donors' behavior. Using a pseudo-principal-agent model, we postulate that although social incentives schemes might increase some individuals' monetary donations, the change in the total amount of donation is dependent on the relationship between the formation of social recognition and the donors' income distribution. We consider three forms of social recognition incentives: no recognition (i.e. surreptitious donations), recognition for the donors' generosity (i.e. absolute donations) and recognition for the donors' generosity and sacrifice (i.e. relative donations). Our model reveals non-intuitive tradeoffs. While recognition for the donors' generosity increases the overall donations, adding information regarding the donors' sacrifice increases the proportion of low-income donors but reduces their typical amount of donation. At the same time, the proportion of high-income donors decreases, however, their amount of donation per-capita turns to be greater. Practical implications will be discussed as beneficiaries may implement different social recognition schemes to potential donors with known income/ wealth.

Presentation **Session Chair**
Gil Peleg, Yeshiva University, New York, NY

Saturday, June 13, 2020
Session "SD"
12:45 PM - 1:45 PM

SD01. Machine Learning Applications II

SD02. Machine Learning, Natural Language Processing, and Digital Platforms

SD04. Mobile App Coupon, Mail-in Rebate, and Limited Time Offer

SD05. Reviews IV

SD06. Artificial Intelligence II

SD07. Marketing and Welfare II

SD08. Consumption

SD09. Purchase and Usage Modeling

SD10. Marketing Strategy and Management II

Session SD01 **Machine Learning Applications II**
01
12:45 PM - 1:45 PM

Presentation 1 **Understanding Box Office From Physiological And Eye-tracking Data Using Fuzzy Machine Learning**
WEN XIE[1], Ming Chen[2], Zhu Han[1], [1]University of Houston, Houston, TX, [2]University of North Carolina at Charlotte, Charlotte, NC, Contact: wxie5@uh.edu
Abstract: In this study, we explore and analyze different patterns of consumers' visual attention and sentimental responses to movies' metadata using eye-tracking technology combined with physiological data such as heart rate. To increase the prediction precision, a novel machine learning method is proposed based on fuzzy logic (Nguyen, Walker, and Walker, 2018) because it can quantify the imprecision of categorical factors. To test the idea, we conducted an eye-tracking experiment with randomly selected representatives who were invited to browse the IMDB.com to acquire information before they make a decision to watch a movie in a theater. Mobile eye-tracking device (Tobii Pro Glass 2) and wearable physiological sensor (Empatica E4 wristband) were used for data collection. We analyze the eye-tracking data using a fuzzy machine learning model and find that textual information (i.e. reviews) receives more eye-fixation counts compare to other information sources such as casting, director, and posters. This result suggests that consumers display different attentional patterns on the abovementioned factors. Furthermore, we analyze the physiological data which include consumers' photoplethysmography and electrodermal activities such as moment-to-moment heart rate acceleration and temperature fluctuation with the purpose to assess consumers' emotional reactions. Our findings could provide new insights into the potential driver of box office revenue from both physiological and eye-tracking perspectives.

Presentation 2 **Investigating Probabilistic Machine Learning in Online Customer Co-creation**
Hannah Chang[1], Anirban Mukherjee[2], [1]Singapore Management University, Singapore, Singapore; [2]INSEAD, Singapore, Singapore.
Abstract: The authors describe and demonstrate the use of probabilistic machine learning for the analysis of networked customer co-innovation data. Unlike deterministic machine learning, probabilistic machine learning explicitly account for and uses the distribution of data features, which makes it more effective in contexts where data is measured imprecisely. Various models are developed and applied in crowdsourced new product development where the wisdom of the crowds is distilled from the votes of the community. The managerial implications of enhanced accuracy and precision in the evaluation of new product ideas are discussed.

Presentation 3 **Analyzing Shopping Behavior Across Multiple Product Categories Using LDA**
Luis Aburto[1], Andres I. Musalem[2], [1]Universidad Adolfo Ibañez, Santiago, Chile; [2]Ing.Ind. U. de Chile, Santiago, Chile. Contact: luis.aburto@uai.cl
Abstract: This project presents a machine learning approach to study interrelationships among product categories and to detect latent shopping trip motivations. Machine learning has experienced major growth in research and applications in the last years. Specifically in retailing, there are many opportunities to use the vast information generated in transactions and loyalty clubs to calibrate different supervised and unsupervised models. In particular, we propose both supervised and unsupervised methods to model the interrelationship among product categories. We rely on Latent Dirichlet Allocation (LDA), which has been widely used in text mining to extract topics from documents, measuring the probability of co-occurrence of words. In our retail context, we will extract latent shopping motivations instead of latent text topics, analyzing relationships among product categories, instead of words, in a transaction instead of a document database.
The contribution of this research is then to apply LDA in a retailing setting, modifying the basic model to achieve three different goals as follows. First, a standard LDA model will be used to detect and describe shopping motivations. Second, the basic LDA model will be extended to jointly estimate the latent shopping motivations and the relationship between these motivations and basket size using a supervised approach. Finally, the LDA model will be generalized to allow purchase motivations to depend on customer and shopping trip characteristics.

Presentation 4 **Bayesian Deep Learning For Small Datasets: Predicting Sales From Bottle Design**
Remi Daviet, University of Pennsylvania-Wharton Marketing Department, Philadelphia, PA, Contact: rdaviet@wharton.upenn.edu
Abstract: Advanced machine learning techniques such as neural networks have shown incredible predictive performance on a large variety of datasets. However, these methods are usually based on objective function optimization and require a large training set to limit the risk of over-fitting and weak out-of-sample performance. For applications to high-dimensional data, such as images, or high dimensional models, hundreds of thousands of observations are necessary. In business applications, the number of observations might be limited. For instance, in a given market, the number of products might only be a few hundreds or thousands, and thus insufficient to fit many machine learning models. To analyze high dimensional data in this situation, businesses have performed dimensionality reduction by selecting features based on domain expertise, and then fitting these features in low-dimensional structural models. We propose to allow the use of complex models such as neural networks on high dimensional data even with small datasets by integrating them in a Bayesian framework, following the nascent probabilistic modelling literature. This allows avoid overfitting and maintain out-of-sample performance. We rely on the efficient gradient-computing abilities of deep learning libraries to apply a Hamiltonian Monte Carlo algorithm for posterior distribution recovery. We show the performance of our method on an application to sales prediction of alcoholic spirits based on the product's bottle design. Using a dataset of all the online sales of spirits in Pennsylvania over a year, we train a neural network to predict sales volumes from high-dimensional features derived from bottle pictures, completed by low dimensional data such as price and category. We show how this approach outperforms both structural methods and classical deep learning in prediction, and how this can also be used to select the design features in order to maximize expected sales for a given segment.

Presentation **Session Chair**
Remi Daviet, University of Pennsylvania-Wharton, Philadelphia, PA

Session SD02 **Machine Learning, Natural Language Processing, and Digital Platforms 02**
12:45 PM - 1:45 PM

Presentation 1 **Consumer Mobile App Choice: Substitutes And Complements**
Xiang Zhou[1], Jingcun Cao[2], **Mantian Hu**[3], [1]The Chinese University of Hong Kong, Shatin, Hong Kong; [2]Faculty of Business and Economics, the University of Hong Kong, Hong Kong, Hong Kong; [3]Chinese University of Hong Kong, Shatin, Hong Kong.
Abstract: There are over two million apps on the app store and the average person has 60-90 apps on their phone. The large scale and heterogeneous app choice sets pose a challenge for researchers to study the consumer app choice. In this study, we follow the approach suggested by SHOPPER and estimate consumer preference for mobile apps based on a large dataset with the usage behavior of over 200K apps for about 1 million users in China. We are interested in answering counterfactual queries about changes in the speed of mobile data plan. We find that our approach provides accurate prediction to help with app recommendations.

Presentation 2 **Asymmetric Information And Entrepreneurial Disincentives In Crowdfunding Markets**
Yan Xu[1], Jian Ni[2], [1]Hong Kong Polytechnic University, Hong Kong, Hong Kong; [2]Johns Hopkins University, Baltimore, MD
Abstract: Reward-based crowdfunding has enabled entrepreneurs to interact with consumers even before product launch. However, this market persistently suffers from a high rate of failure, i.e., entrepreneurs fail to launch and deliver their products as promised. We model the product launch decision of an entrepreneur who raises funds through reward-based crowdfunding, and subsequently decides whether to continue with product launch. Specifically, we investigate the extent to which product launch decisions of different types of entrepreneurs are influenced by the sales in the crowdfunding stage. To do so, we collect structured and unstructured data from Kickstarter's video game category, and classify attributes using supervised learning methods. We develop and estimate an integrated model of crowdfunding demand and entrepreneur product launch decisions. We find that the information from crowdfunding has a much greater impact on low-managerial-capital entrepreneurs' product-launch decisions and that entrepreneurs with more fundraising experience are more likely to internalize information from crowdfunding into their product-launch decisions. We then evaluate the effectiveness of two platform policies—restricting pledge options and regulating overfunded projects. We find that both policies can significantly increase entrepreneurs' willingness to launch, while the restricting-pledge-options policy is more effective among entrepreneurs with low managerial capital.

Presentation 3 **Mobile Health Behavior Tracking: Health Effects Of Tracking Consistency And Its Prediction**
Linda Hagen[1], **Yikun Jiang**[2], Bärbel Knäuper[3], Kosuke Uetake[4], Nathan Yang[5], [1]USC Marshall School of Business, Los Angeles, CA, [2]UC Berkeley, Berkeley, CA, [3]McGill University, Montreal, QC, Canada; [4]Yale School of Management, New Haven, CT, [5]McGill Desautels, Montreal, QC, Canada.
Abstract: New technologies aimed at nudging millions of individuals towards healthier behavior (e.g., fitness trackers, wearables, A.I.-based health coaching) increasingly focus on allowing user to track their own health goal-directed behavior on an ongoing basis. However, little is known about (1) whether or not consistent personal health behavior tracking actually yields noticeable health benefits in the long run (e.g., weight loss) and, if so, (2) what factors predict consistent tracking activity over time. Using data from a popular mobile fitness app, we use a novel machine learning method for flexible instrumental variable discovery to show that greater consistency in calorie tracking (i.e., frequency and continuity) leads to greater weight loss in the long-term. The importance of tracking in itself then motivates our predictive analytics, where we assess the importance of progress-based (e.g., past weight loss, staying within one's calorie budget), behavior-based (e.g., last period's exercise and food calories, past tracking behavior), and demography-based (e.g., age, gender, initial weight, initial distance to goal weight) features for predicting consistent tracking. This predictive analysis reveals that while behavior-based predictors are among the most important predictors, progress-based predictors are also important (e.g., past calories over/under budget).

Presentation 4 **Is The Customer Always Right? The Heterogeneous Effects Of Customer Co-creation On Product Performance**
Matthew Osborne, Minjee Sun, University of Toronto, Toronto, ON, Canada. Contact: matthew.osborne@rotman.utoronto.ca
Abstract: Co-creation arises when companies engage customers in the product development to identify and meet market needs. However, what kinds of customer feedback can be valuable, and the extent to which developers should accept input are relatively unexplored. We analyze this issue using web-based novel contest data where any website visitors can provide feedback and writers can modify episodes during the contest. Using natural language processing and sentiment analysis, combined with a causal inference approach, we quantify (a) what kinds of comments writers respond to, and (b) the impact of responses on long-term profit.

Presentation **Session Chair**
Matthew Osborne, University of Toronto, Washington, DC

Session SD04 **Mobile App Coupon, Mail-in Rebate, and Limited Time Offer**
04
12:45 PM - 1:45 PM

Presentation 1 **Sequential Targeting In Mobile App Retention With Deep Reinforcement Learning**
Xiao Liu[1], **Fanglin Chen**[1], Gaomin Wu[1], Jiawen Yan[2], [1]New York University, New York, NY, [2]Columbia University, New York, NY, Contact: fchen@stern.nyu.edu
Abstract: Increasing the retention rate is crucial for shopping apps, as it will lead to more engagement, greater loyalty, and higher conversion. In this project, we employ the data from Taobao Live app, the biggest livestream shopping platform in China. The key strategy to boost user retention on this platform is to send rewarding coupons to users when they log in. Users log in sequentially and differ in customer value, and their value is revealed only after they log in, which leads to an intertemporal tradeoff for the app. If the platform initially sends coupons to everyone, it may run out of budget for potentially high-value users who arrive later on. On the contrary, if the platform holds coupons and waits for high-value users, it may not attract enough users and waste some coupons. Also, the coupons one receives on previous days may shape her expectation for the current coupon and further influence her customer value. Taking into account intertemporal tradeoffs and consumer expectations, we propose a forward-looking sequential targeting solution with deep reinforcement learning to optimize the allocation of coupons and maximize the user retention rate. As a model-free approach, our model is not prone to bias in dynamic structural models due to model misspecification, and thus could be widely applied to various contexts. To extract information from dynamic user features, we take advantage of deep neural networks to represent the high-dimensional state space. In addition, we satisfy the budget constraint by including the cost of coupons as an extra component in the objective function. We conduct our algorithm in a field experiment and show improvements in both daily and weekly retention rates compared with random as well as myopic targeting policy.

Presentation 2 **Limited Time Offer as an Invitation to Search**
Zheng Gong[1], Jin Huang[2], [1]University of Toronto, Toronto, ON, Canada; [2]New York University Shanghai, Shanghai, China.
Abstract: Sellers use limited time offers to inform consumers of any kind of special deal available for a short period of time. We investigate how this sales tactic influences consumers' purchase intent, the order in which consumers consider options, and firms' profits in search markets. We consider a model in which a consumer engages in sequential search based on advertised prices. Search is costly and takes time for the consumer, and sellers can promote limited time offers to earn search prominence. We show that a limited time offer is the most profitable pricing scheme for a monopolist if and only if a consumer searches the monopolist's product first is socially optimal. In a competitive market, all firms use LTO and consumers search in a socially optimal order in equilibrium. Despite strictly higher social welfare, firms may make lower profits relative to a situation where only uniform pricing is possible. We also find that, counter-intuitively, a firm in the prominent position in equilibrium may make less profit than his competitor under the limited time offer competition.

Presentation 3 **Consumer Demand under Mail-in Rebate Promotion**
Shengyu Zhu, Yufeng Huang, Mitchell Lovett, James Prinzi, University of Rochester, Rochester, NY

Presentation **Session Chair**
Shengyu Zhu, Simon Business School, University of Rochester, Rochester, NY

Session SD05 **Reviews IV**
05
12:45 PM - 1:45 PM

Presentation 1 **The Greener The Better: How Sustainability Influences Review Helpfulness**
Grace Yu-Buck, Arul Mishra, Himanshu Mishra, University of Utah, Salt Lake City, UT
Abstract: While many companies are focusing on doing business in a sustainable way, it is important to study how consumers react to these efforts. One way to study how consumers feel about such efforts is to see how consumers talk about a company's product in relation to sustainability. Online reviews are one of the forums used by customers to share their experiences with the product. If sustainability is a construct customers consider important, then we should observe its prevalence in their reviews and subsequently its impact on other consumers. This research applies a natural language processing algorithm, word embedding, to examine 1) the presence of sustainability in reviews and 2) the fit between sustainability in product reviews and product description on helpfulness votes since helpfulness votes serves as a good dependent variable to determine the impact of sustainability on other consumers. We examined over 600,000 reviews from Amazon.com with the reviews spanning multiple product categories. The results reveal that the stronger the presence of the sustainability construct in product reviews, the higher helpfulness votes are received. Similarly, a greater fit between sustainability in the reviews and description results in more helpfulness votes. This research helps to understand how the presence of the sustainability construct in reviews and description affect how helpful other consumers find the information.

Presentation 2 **What Is More Important Online Review Volume Or Content? It Depends**
Mariya Topchy, University of Connecticut, Storrs, CT, Contact: mariya.topchy@uconn.edu
Abstract: Over the last 20 years, researchers across several fields have studied the predictive and explanatory power of online reviews. Although researchers agree that review volume, measured as number of reviews, and content, commonly measured as average rating, influence product sales, an important question remains unanswered. In this paper, the authors examine whether online review volume or content has a greater influence on product sales. The authors suggest that online reviews can affect consumer decision making and, correspondingly, sales through two distinct processes—word of mouth and observational learning—and that the relative importance of these processes varies across product categories. Using data on 3174 products across 17 major product categories, the authors estimate an econometric model that accounts for unobserved heterogeneity, temporal order of events, and endogeneity, and find that, on average, review volume has a three times greater influence on sales than review content, yet there exists significant heterogeneity across product categories. Additionally, several product characteristics such as functional risk, compatibility, and observability moderate the influence of review volume and content on sales. The study offers several managerial and theoretical contributions.

Presentation 3 **THE EFFECTS OF UBER/LYFT ENTRY ON RESTAURANT SERVICE QUALITY**
minkyu shin[1], Jiwoong Shin[1], Soheil Ghili[1], Jaehwan Kim[2], [1]Yale School of Mangement, New Haven, CT, [2]Korea University, Seoul, Korea, Republic of. Contact: minkyu.shin@yale.edu
Abstract: This research seeks to demonstrate the impact of the gig economy on the local economy beyond its incumbent industries through the labor market. In particular, we examine the impact ride-sharing companies such as Uber and Lyft have had on the other industries, such as the restaurant industry. We design our analysis around a natural experiment where Uber and Lyft exited the local market in May/2016 and returned in May/2017 in Austin due to the regulatory policy changes. We compared the quality before and after the Uber/Lyft's exit and entry into the local market by scraping all the Yelp reviews on the restaurants in Austin from 2014 to 2019. Our empirical strategy is based on a "difference-in-difference" approach. Our results suggest that the entry of Uber/Lyft have lowered the service quality of restaurants while there is no change in food quality. Moreover, this effect is more pronounced for restaurants with lower price ranges, represented by one-dollar sign in Yelp than restaurants in other tiers. Furthermore, we do not find this effect in the other control city, San Antonio during the same time period. In addition to Yelp reviews data, we also examine the turnover rates of restaurant workers by leveraging a unique dataset of 850 restaurants in Austin or San Antonio from 2014-2019. The results are consistent with the findings from review data. The turnover rate of waitstaff, not chef, increases after Uber/Lyft returned to the local market, suggesting that the expansion of such a gig economy has provided new sources of labor work opportunities for low-skilled workers. Thus, our findings suggest significant ramifications of the gig economy on the broader industries through the labor market.

Presentation 4 **Does Word-of-mouth Echo Matter? An Empirical Study Of Critics And User Reviews In The Movie Industry**
Eunsoo Kim[1], Xin (Shane) Wang[2], Shijie Lu[3], [1]Nanyang Technological University, Singapore, Singapore; [2]Ivey Business School, Western University, London, ON, Canada; [3]Univeristy of Houston, Houston, TX, Contact: eunsoo@ntu.edu.sg
Abstract: Online review platforms usually generate reviews from both experts and general users. In this research, we propose a new word-of-mouth (WOM) measure, echo as the topic consistency in review text by experts to that by general users and study the financial consequences of WOM echo. A greater WOM echo can be viewed as crowdsourced validation from the general population to points raised by experts, therefore increase the persuasive effect of professional reviews, and/or the other way around. To investigate the effect of WOM echo, we focus on the movie industry and measure the WOM echo between critic and user reviews on Rotten Tomatoes and IMDb using topic models. We gather box office revenue and online WOM data for 658 movies released in the United States between January 2013 and December 2017. We find that the overlap in key topics covered by critic/expert reviews and those by user reviews is positively associated with the box office revenue, suggesting a positive relationship between WOM echo and movie demand. Furthermore, the greater WOM echo appears to strengthen the persuasive effect of user reviews and dampen the persuasive effect of critic reviews. We provide evidence that these findings are robust to alternative specifications of WOM echo. Finally, we further validate through experiment that a greater WOM echo leads to a higher willingness to watch a movie.

Presentation **Session Chair**
Eunsoo Kim, Nanyang Technological University, Singapore, Singapore.

Session SD06 **Artificial Intelligence II**

06

12:45 PM - 1:45 PM

Presentation 1 **The Powers And Perils Of Human-like AI: A Field Experiment In An E-learning Environment**

Seonghun Yun, Korea Advanced Institute of Science and Technology (KAIST), Seoul, Korea, Republic of. Contact: ysh6878@kaist.ac.kr

Abstract: As firms has increasingly and widely adopted artificial intelligence (AI) to communicate with consumers, they tend to create AI agents with concrete human-like cues so as to increase their customers' familiarity with AI. Due to the uncanny valley, however, there have long been on-going discussions on the extent to which AI should resemble a human being. Although researchers delved into the powers and perils of the personification of AI, few studies have attempted to empirically investigate how consumers respond to the personification of AI in a real world setting. We exploit the unique opportunity to utilize a field experiment in an e-learning context and empirically test hypotheses built upon the economics and psychology literature regarding (1) consumers' sense of unity toward providers when interacting with providers; (2) gender stereotype bias; and (3) consumers' obedience to the authority from the provider.

Presentation 4 **Does Equal Access To Ai Decrease Performance Gap? : Evidence From Korean Go Players**

Minkyu Shin[1], Jin Kim[2], Minkyung Kim[3], [1]Yale SOM, New haven, CT, [2]Yale University, New Haven, CT, [3]UNC Chapel Hill Kenan-Flagler Business School, New Haven, CT, Contact: minkyu.shin@yale.edu

Abstract: Artificial Intelligence (AI) generates more effective, albeit less understandable decisions at the board game Go. Public release of open-source AI-based analysis tools allow human Go players of all skill levels to analyze and simulate consequences of any move at any stage of the game. But whose game improves more from access to AI, weaker or stronger players'? On the one hand, weaker players may learn more from AI and catch up to stronger players at a faster rate than they otherwise would have, reducing the performance gap. On the other hand, stronger players may better understand and internalize the baffling yet effective moves by AI algorithm, widening the performance gap. Analyzing professional Go players' game outcomes and move patterns before and after AI tools became widely available in South Korea, we examine the change in performance gap and discuss the economic and social implications of AI.

Presentation 2 **Can Smart Stores Comprehend Consumers' Behavior And Improve Business Performance?**

Tsung-Yin Ou[1], CHIH-YING LIU[2], [1]National Kaohsiung University of Science and Technology, Kaohsiung City, Taiwan; [2]Graduate Program in Marketing and Distribution Management, Kaohsiung City, Taiwan. Contact: oupaul0502@gmail.com

Abstract: he density of convenience stores in Taiwan is among the highest in the world, but in recent years the market has become saturated and expansion has slowed. In response, store operators have begun to combine information technology and data science to understand consumer behavior and create new services and experiences for shoppers. At present, promotions are planned by headquarters and executed by direct-sale stores or franchisees who differentiate activities according to store type, location and consumer behavior. But operators are accustomed to managing activities and associated commodities based on experience, not data, due to a paucity of data-driven knowledge of consumer behavior. This study adopted an artificial intelligence (AI) facial recognition system to create a smart-retail field, then integrated cross-platform data analysis on gender & age-group of customers, sales data, market data and interviews with store operators. The cluster analysis integrated association rule was used to determine the relevance of purchases. Consumer characteristics and behavior across various time intervals were then analyzed. Results showed significant variation in goods purchased by consumers of different genders and ages at different business hours. Six specific marketing plans were then proposed. Implementation revealed the plans significantly increased sales revenue in five of six cases.

Presentation 3 **Mixed Reality (MR) Consumer Response To Retailing In The Multiplex: Artificial Intelligence-based Interactive Storytelling Marketing**

Christine Eunyoung Sung[1], Sujin Bae[2], Danny Da-In Han[3], Ohbyung Kwon[2], [1]Montana State University, Bozeman, MT, [2]Kyunghee University, Seoul, Korea, Republic of; [3]Breda Univeristy of Applied Science, Breda, Netherlands.

Abstract: Retail dynamics have been changing rapidly with the introduction of novel technological solutions in the consumer market. Although technology has been adopted and accepted as part of consumers' daily lives, applied technology is relatively new in the retail environment. Recent applied technology in the retail environment includes mixed reality (MR) together with augmented reality (AR) and virtual reality (VR), artificial intelligence (AI), and holograms. Several key challenges must be overcome to integrate MR solutions into the retail environment. We seek to answer two research questions: Which factors drive the adoption of MR in the multiplex retail environment? Moreover, which factors drive consumers' behavioral responses to the MR multiplex retail shopping experience? We tested moderator effects (e.g., AI, MR, and hologram interaction) on storytelling satisfaction and eventually on consumer decision making and social sharing intention on social media. Gabriel (2000) argued that narrating a story would trigger cognitive and emotional processes within the audience. While storytelling has been applied in various contexts, it has particularly contributed in the marketing field as a tool to transform information into engaging content. Data were collected at *L'atelier*, a 17-million-dollar mixed reality multiplex space. This space is designed for the enjoyment of advanced technology entertainment as it applies to shopping and the arts. Among the 242 survey participants who completed the MR experience and survey on site, 36 respondents did not pass an attention check question (Huan et al., 2012; Stenstrom and Curtis, 2012) and were not included in the final analysis. Thus, the final sample consists of 206 participants (female=68%). PLS-SEM was used to test the study model as the effect of the applied technology on interactive storytelling marketing.

Presentation **Session Chair**

Christine Eunyoung Sung, Montana State University, Bozeman, MT

Session SD07 **Marketing and Welfare II**
07
12:45 PM - 1:45 PM

Presentation 1 **A Study Of The Effects Of Legalization Of Recreational Marijuana On Consumption Of Cigarettes**
Ashutosh Bhave[1], B.P.S. Murthi[2], [1]University of Texas at Dallas, Richardson, TX, [2]University of Texas- Dallas, Richardson, TX, Contact: acbhave271992@gmail.com
Abstract: Colorado was the first state to legalize recreational marijuana use in 2012 and the product was available for sale in January 2014. The impact of legalization of marijuana for recreational use in Colorado has been studied to assess its effect on crime rates, hospitalizations, traffic accidents, incarceration rates and other related aspects. Even though medical journals have shown a positive relationship between marijuana and tobacco consumption among adults and among youth, the effect of legalization on tobacco sales has not been examined. We use retail scanner data from A.C. Nielsen to quantify the change in cigarette sales attributable to legalization. We use difference-in-difference (DID) as well as synthetic control methods to show that legalizing recreational use of marijuana is associated with an increase in cigarette consumption by about 4-7%. We conduct several robustness checks and extend the analysis to Oregon, and find similar results. Further, we study which demographics are more likely to be affected and which store types would be affected. These results have implications for both public policy and for the tobacco industry. We conclude that states should exercise caution while attempting to legalize marijuana for recreational purposes.

Presentation 2 **Does Regulatory Investigation Of A Vehicle Defect Help Or Hurt Recall Initiation And Completion?**
Peng Shen[1], Vivek Astvansh[2], [1]Indiana University Bloomington, Bloomington, IN, [2]Kelley School of Business, Indiana University Bloomington, Bloomington, IN, Contact: shenpeng@indiana.edu
Abstract: News media and public safety advocates often accuse product manufacturers for taking too long to investigate a potential product defect and initiate a recall (e.g., Toyota's 2010 recall). In response to such accusations, lawmakers have demanded the relevant regulator to start its parallel investigation of a product defect. Such demands assume that the regulatory investigation positively influences the manufacturer, expediting latter's investigation and decision of initiating a recall. The authors provide empirical evidence against the above assumptions. They first draw attention to the actual outcome that is at stake - completion, and not mere initiation, of recall. In the context of 2,321 vehicle recalls initiated in the U.S. during 2009-2019 by 25 manufacturers, the authors show that the manufacturer takes longer to complete its defect investigation when the regulator also starts a parallel investigation. The authors' conversations with the NHTSA suggest that when the regulator starts an investigation of its own, the manufacturer has to do substantial "paperwork," which distracts rather than positively influence the manufacturer in its investigation. The authors next demonstrate that regulatory investigation delays not only the recall initiation (time between defect discovery and recall initiation), but also the recall completion. They show that this adverse effect is mediated by incomplete recall planning by the manufacturer (more time to notify customers). The results are robust to alternative model specifications and estimations. The evidence suggests that public safety is better preserved when the regulator collaborates rather than compete with the manufacturer in defect investigation.

Presentation 3 **The Relationship Between Product Recalls And Product Discontinuations**
Seyyed Amirali Javadinia[1], Amirali Kani[2], [1]Florida Atlantic University, Boca Raton, FL, [2]University of Guelph, Guelph, ON, Canada. Contact: Sjavadinia@fau.edu
Abstract: Product recalls have increased substantially over the past decades, especially in the automobile industry. In this research, we address how recalling a product over time may lead to product discontinuation, i.e. permanent withdrawal of the product from the market. Using a hazard model on a dataset of over 600 discontinued vehicle models, we aim to predict how the frequency and magnitude of recalls for a model may affect its time of withdrawal from the market. We find that conditional on the firm's shared product assets and the severity of the defect addressed by the recall, recall frequency, and magnitude may increase the time to withdrawal because of the firm's increased learning of product failures and also an escalation of commitment. To increase the validity of our results, we also control for the number of model upgrades, monthly sales of the model, and the firm's introduction of similar models. Our findings offer valuable insights for managerial practice and public policymakers.

Presentation **Session Chair**
Seyyed Amirali Javadinia, Florida Atlantic University, Boca Raton, FL

Session SD08 **Consumption**
08
12:45 PM - 1:45 PM

Presentation 1 **Navigating Overwhelming Choice In Access-based Consumption Channels: The Vital Role Of Curation**
Nils Wloemert[1], Dominik Papies[2], Harald Van Heerde[3], [1]Vienna University of Economics and Business, Vienna, Austria; [2]University of Tuebingen, Tuebingen, Germany; [3]University of New South Wales, Sydney, Australia. Contact: nils.wloemert@wu.ac.at
Abstract: Users of access-based online content services such as Spotify and Netflix are confronted with seemingly unlimited choice. In order to navigate these vast content libraries, users may rely on curated selections, compiled by, e.g., experts or other users. In this paper, we study how curated playlists on music streaming services affect consumption behavior and how content owners (e.g., artists or labels) can strategically use these lists as a new marketing tool to impact consumption in two ways. First, the inclusion of a song on a playlist may impact the number of streams a song receives from subscribers of the playlist as long as the song is included on the playlist (i.e., short-term consumption). Second, playlists may facilitate music discovery and impact streams even after the song is de-listed from a playlist if subscribers place the song in their personal collections (i.e., long-term consumption). To estimate these effects, we collect information about the daily number of streams a song receives from i) playlists, and ii) personal collections on a large streaming service for a sample of more than 20,000 songs that are included on more than 100,000 playlists over a period of 669 days, for a total number of 15m. observations. Based on error correction models, we find a strong positive effect of being included on a playlist on the number of streams a song received from playlists. Our results also uncover substantial heterogeneity across types of playlists, with stronger effects for playlists with more followers, as well as frequently updated playlists with overall fewer, rather dissimilar songs. We further find that while particularly well known songs benefit from playlists through increased short-term consumption via playlists, less well-known songs benefit disproportionally from playlists through music discovery and increased long-term consumption via personal collections. The playlist effects are much stronger than the effects of traditional advertising, highlighting the vital role of curation in settings with abundant choice.

Presentation 2 **Time And Space Factors In Tourists' Decision-making: A Tourism Intertemporal Consumption Model**
JIALE HUO[1], Liaogang Hao[2], JIANXI LIU[3], [1]Southwest Jiaotong University, chengdu, China; [2]Southwest Jiaotong University, Chengdu, China; [3]Sichuan University, chengdu, China. Contact: huojiale@hotmail.com
Abstract: Time and space are two important elements in tourism decision-making. From the time perspective, the mental budget period length is an important factor influencing tourists' consumption decisions. From the spatial perspective, the nature of tourism is a change in geographic location. Spatial distance not only affects the decision-making of consumers in physical attributes but also affects the decision-making in internal psychological mechanism. This paper explores the influence of spatial distance on the mental budget period length from the perspective of time and space and constructs a tourism intertemporal consumption model based on the theory of mental accounting, Construal-level theory and time discount theory. At the same time, the perceived control is taken as the mediator variable. We also study the influence of mental budget period length on the delayed consumption behavior. The study used real travel data from tourism e-commerce websites to investigate the main effect. The results show that the spatial distance will affect the length of the mental budget period, and the distant spatial distance can stimulate consumers to make budgets in a longer period. Next, the authors tested the proposed research hypotheses and models through experiments. The results show that the perceived control has mediating influences. Specifically, compared with the high-perceive control environment, the spatial distance in the low perceived control environment has a greater positive impact on the period of the tourist's mental budget. Further, we find that the mental budget period length will affect the delayed consumption behavior of tourists. The longer the period of tourists' mental budget period, the more they prefer to delay consumption. The theoretical significance of this paper mainly includes the following aspects: First, we develop a tourism intertemporal consumption model considering both space and time factors, which fills the existing research gap. Second, this paper investigates the Relationship Between Space Dimension and time dimension.

Presentation 3 **The Effects Of Pregnancy And Child Birth On Consumption**
Veronica Diaz[1], Ricardo Montoya[2], Oded Netzer[3], [1]Universidad de Antofagasta, Antofagasta, Chile; [2]University of Chile, Santiago, Chile; [3]Columbia University, New York, NY, Contact: veronica.diaz.gomez@uantof.cl
Abstract: Major life transitions such as relocation, new job or pregnancy and birth of a child can have major implications on one's lifestyle and consumption patterns. In this research, we study how the consumption behavior of first-time parents is affected, both during pregnancy and after birth. We combine a unique dataset that identifies precisely the date of childbirth with a supermarket credit card data where we observe detailed supermarket transactions and aggregated purchases made at different external companies using the credit card to investigate the relationship between pregnancy and childbirth and consumption. To examine the causal effect of pregnancy and childbirth on consumption, we use a causal random forest methodology.
Our results show statistically significant impacts in 22% of the analyzed product categories during the pregnancy period and in 30% of the product categories studied during the post-birth period. The most affected categories by the first-child pregnancy were home improvement (+), travels (-), health (+) and entertainment services (-). On the other hand, the most affected categories by first-child birth were travels (-), health (+), restaurants (-), entertainment services (-) and pharmacy (+).

Presentation 4 **Does Instagram Lead to Conspicuous Consumption? The Mediating Roles of Envy, Narcissism and Self-Promotion**
Lawrence L. Garber, Pauline Escande, Elon University, Elon, NC
Abstract: Taylor and Strutton (2016) examine the effect of Facebook usage on conspicuous online consumption, and the mediating roles of envy, narcissism and self-promotion. We extend their model to an examination of the effects of Instagram usage among college students. Seven hundred students from a southwestern US university who are regular users of Instagram completed a survey that includes scales measuring their degree of Instagram usage, proneness toward feelings of envy and narcissism, and tendencies for self-promotion and conspicuous online consumption. A structural equation model was run using SAS PROC CALIS (2020). Results confirm Taylor and Strutton's (2016) model for Instagram, indicating that Instagram usage positively influences feelings of envy and narcissistic tendencies, which in turn

positively affect conspicuous online consumption directly, and indirectly via inclination toward self-promotion. Extending these results is an important step in confirming these results for the current generation of college students, who have largely abandoned Facebook for Instagram, and for determining whether social media in general lead to conspicuous consumption. Theoretical and managerial implications are to be discussed.

Presentation **Session Chair**
Lawrence L. Garber, Elon University, Elon, NC

Session SD09 **Purchase and Usage Modeling**
09
12:45 PM - 1:45 PM

Presentation 1 **SUBSCRIPTION AND CASUAL CUSTOMERS DIFFERENTIAL SENSITIVITY TO WEATHER CHARACTERISTICS**
Rajesh K. Sinha, Indian Institute of Management Indore, Indore, India. Contact: rajesh8krs@gmail.com
Abstract: Marketers interest in understanding the influence of weather on consumer behavior has grown in recent times. Research studies have observed the influence of weather types on consumer behavior and some of them suggest that sunshine could induce preferable consumer behavior than rainy days because sunshine produces good mood. However, apart from good mood, customer types can also be a factor that can contribute to the observed weather-effects. This research focus on two consumer types: regular customers (subscription) and casual customers (non-subscription), apart from changes in weather characteristics to investigate weather-effects. Weather influences consumers mood, thus their behavior. Although weather's influence on consumers' psychological mood is expected to be more-or-less uniform; however, based on public bike share (PBS) data, this study finds that regular customers' aggregate daily usage level variations are relatively more sensitive to weather situation changes (i.e., temperature, humidity, wind-speed) than that for casual customers. The observed non-uniform sensitivity levels suggest that consumers learn to associate weather with corresponding usage benefits, and in the case of regular customers, because the learning level is higher, it results in relatively higher sensitivity. The findings are obtained after accounting for the possible non-linear influence of the changes in weather characteristics and including a situational variable that distinguishes casual and regular customers.

Presentation 2 **Competing For Time: A Study Of Mobile Applications**
Han Yuan, The University of Arizona, Tucson, AZ, Contact: hanyuan@email.arizona.edu
Abstract: A smartphone user allocates her time among millions of mobile applications. I build a model of time allocation to accommodate three salient features of app usage: 1), consumers only use a small set of apps; 2), apps can be substitutes or complements; 3), consumers have a binding time constraint. I estimate the model with a panel data of market shares and usage of popular apps for market-weeks in China. I identify complementarity (substitutability) from correlation in preferences with common user data and supply side IVs. The update history of an app should correlate with the utilities of this app but not those of other apps. The estimated model recovers a reasonable competition pattern and can be used to simulate how consumers would reallocate their time in different counterfactuals.

Presentation 3 **An Empirical Study Of The Role Of Marketing In The Opioid Epidemic**
Rachel Ramey[1], Sundar Bharadwaj[2], [1]University of Georgia, Athens, GA, [2]University of Georgia, Athens, GA, Contact: rachel.ramey@uga.edu
Abstract: In 2017 the odds of dying from opioid overdose surpassed those of death from a motor vehicle crash for the first time (National Safety Council, 2017). Several media sources have claimed that the Opioid Epidemic was, in part, caused by the marketing efforts of pharmaceutical companies and many of these firms have continued to face lawsuits for their role in promoting prescription opioids. Despite these concerns, there has been little systematic research to examine the role of marketing in the Opioid Epidemic. Unlike research on the crises in the field of medicine, this research focuses on the role of advertising and detailing, is conducted at a granular level (month and county level) and accounts for potential endogeneity. In this study, we use proprietary data from opioid sales and marketing practices that collected from lawsuit filings and media investigations, and data on opioid related death from the CDC. This study investigates the role of pharmaceutical firm detailing, and advertising towards physicians, to determine the causal impact on the increase in opioid prescription claims and the subsequent fueling of overdose deaths in the Opioid Epidemic.

Presentation **Session Chair**
Rachel Ramey, University of Georgia, Athens, GA

Session SD10 **Marketing Strategy and Management II**
10
12:45 PM - 1:45 PM

Presentation 1 **Measuring B2B Marketing's Impact In The Presence Of Intra-group Dynamics**
Linge Xia[1], Neeraj Arora[2], Paul R. Hoban[3], [1]University of Wisconsin-Madison, Madison, WI, [2]University of Wisconsin-Madison, Madison, WI, [3]University of Wisconsin, Madison, WI, Contact: lxia2@wisc.edu
Abstract: In the business-to-business (B2B) context, purchase decisions regularly involve multiple individuals. The unobserved interactions between and influence structure among these individuals can complicate the measurement of marketing response, a necessary input to resource allocation decisions. In this paper, we present a novel model that (1) captures the intra-group dynamics of the decision-making units, (2) assesses the effectiveness of marketing touch-points, and (3) improves marketing resources allocation across potential targets. Our work builds on the organizational buying literature (Johnston and Lewin 1996), and we propose a framework that incorporates marketing touchpoints and unobserved intra-group interactions. We borrow from the group decision-making literature (Arora and Allenby 1999, Arora, Henderson, and Liu 2011) to model the intra-group dynamics and joint decision-making processes (Yang and Ghose 2010). Applying our model to data from a B2B communications equipment company, we categorize individual decision-makers based on their roles: technical, bridge, and strategic. We find technical individuals exhibit the highest response to seller-initiated touch-points, followed by bridge and then strategic. Both technical and bridge initiated touch-points positively drive purchase probability, but there is no statistically discernible response from strategic individuals. Further, the intra-group dynamics appear to be negative, such that when one role initiates interactions with the seller others are less likely to engage. Based on these results, we find that managers should focus their marketing efforts on individuals serving in technical and bridge roles. Marketing to strategic contacts actually decreases both the probability of a sale and its dollar value.

Presentation 2 **Economic Policy Uncertainty And Firm Value**
Saurabh Mishra[1], Sachin B. Modi[2], Michael Wiles[3], [1]George Mason University, Fairfax, VA, [2]Wayne State University, Detroit, MI, [3]Arizona State University, Temple, AZ, Contact: smishra8@gmu.edu
Abstract: This study evaluates the financial impact of economic policy uncertainty (EPU) on firms. Further, the study investigates the role of marketing and operations resources in the EPU-firm value relationship. The theoretical predictions are empirically assessed through analysis of secondary and longitudinal data for a comprehensive sample of firms across multiple industries in the United States. Results confirm that EPU lowers firm value. Findings further reveal that marketing resources help attenuate the financial loss arising from EPU, whereas operations resources amplify the loss. Together, the theory and results underscore the value relevance of marketing resources for firms and contribute to the marketing-finance literature.

Presentation 3 **Dysfunctional Effect Of Mergers And Acquisitions On Customer Satisfaction: Mediating And Moderating Processes**
Cem Bahadir[1], Nita Umashankar[2], Sundar G. Bharadwaj[3], [1]University of North Carolina at Greensboro, Greensboro, NC, [2]San Diego State University, San Diego, CA, [3]University of Georgia, Athens, GA, Contact: scbahadi@uncg.edu
Abstract: Many Merger and Acquisitions (M&A) do not live up to the expectations. Past work has attributed their poor performance to a myriad of financial and organizational issues. However, a plausible missing link is the fact that customers may be negatively affected by a multitude of post-M&A changes. The authors build on the attention-based view of the firm to develop their hypotheses and perform a difference-in-difference analysis of customer satisfaction scores of firms that engage in M&As versus alternative control samples of firms that do not. The analyses address selection and endogeneity issues, which allow for a causal interpretation of the results. The authors find that M&As cause a decrease in customer satisfaction. The authors empirically demonstrate that managerial attention to customers indeed mediate the relationship between M&As and the decline in customer satisfaction. They also find that firms that are customer-centric (i.e., those that emphasize marketing activities and customer service and are structured around customers (vs. products)) are less susceptible to a decline in post-M&A customer attention. Overall, this work generates implications for senior executives who are considering engaging in M&As, M&A integration consultants, and antitrust regulators.

Presentation 4 **Speaking Of Marketing: Understanding The Value-relevance Of Marketing Through Text Analysis Of Regulatory Filings**
Ty Henderson, University of Texas at Austin, Austin, TX, Contact: ty.henderson@mccombs.utexas.edu
Abstract: If business speaks its own language, how does it talk about marketing? Utilizing regulatory filings available via the Securities and Exchange Commission that contain self-reported text descriptions of business operations, this research seeks to understand whether and how differences in the way marketing is described by firms in regulatory filings impacts their business performance. In contrast to extant text analysis research that often focuses on the sentiment of what consumers say in electronic forums, this research examines the statements that firms issue and the implications of those words on differential business outcomes. Relative term frequency is a continuously-valued measure of marketing focus that can be computed for all publicly-traded firms and complements existing measures of marketing obtained from financial disclosure data such as advertising expenditure. The results demonstrate that variation in marketing term frequency is positively related to firm intrinsic value and that term utilization has a distinct role in understanding the value-relevance of marketing. Text vectorization via a word embedding algorithm facilitates an exploration of the semantic context for marketing within the language of business to highlight words synonymous to marketing in regulatory filings. Multi-year analysis over firms, across terms and through time reveals stable interrelationships among marketing-relevant terms and a consistent relationship to firm intrinsic value. This research offers a novel approach to examining marketing strategy using text data that complements existing research on the differential role of marketing within the firm, and intends to advance the broader research conversation about both text analysis tools and marketing strategy.

Presentation **Session Chair**
Ty Henderson, University of Texas at Austin, Austin, TX